STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOUTHEAST REGION

PRELIMINARY ENGINEERING REPORT

JNU - 10TH STREET / EGAN DRIVE INTERSECTION IMPROVEMENTS

PROJECT NO. 70168 /NH-F-093-2(29)

December 2002

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JUNEAU – 10TH STREET \ EGAN DRIVE
INTERSECTION IMPROVEMENTS

NOTICE TO USERS

The Alaska Department of Transportation and Public Facilities (Department) is studying alternatives that address the existing and anticipated problems at the 10th Street/Egan Drive and Douglas / North Douglas intersections. This Engineering Reconnaissance Report contains the results of the Department's preliminary engineering studies, identifies environmental issues, presents alternatives, and recommends a preferred engineering solution for development under Project No. NH-F-093-2(29), 70168.

In addition to this report the reader is advised to consult the *10th Street/Egan Drive Intersection Improvements Final Traffic Study Report,* dated June 2001, written by Kittelson and Associates, Inc. for the Alaska Department of Transportation and Public Facilities. The traffic study report contains a substantial amount of additional information relevant to this project.

This report reflects the thoughts and design decisions, as of the date of this report. Changes occur frequently during the project development process. Persons relying on information contained in this report should contact ADOT&PF for the most current information. For more information please contact the Design Group Chief, at (907) 465-4439.

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EXECUTIVE SUMMARY

Background
The intersection of Egan Drive and 10th Street is one of the busiest intersections in Southeast Alaska. The intersection connects Egan Drive, Juneau's principal arterial highway, and the Douglas Bridge, which provides the only roadway link to Douglas Island and the community of Douglas. The majority of the vehicles that access downtown Juneau from Douglas Island and the Mendenhall Valley pass through this intersection. Most of the commuters in Juneau make at least one trip through this intersection every workday. The intersection currently serves approximately 28,000 vehicles per day. In the design year (2022) traffic is expected to increase to 38,000 vehicles per day. The intersection experiences substantial peaks in traffic demand during the AM and PM peak hours. The traffic volumes entering the 10th and Egan intersection are resulting in congestion and traffic delays, particularly during the AM and PM peak hours.

Project Purpose
The purpose of this project is to improve the capacity and safety of the 10th and Egan and the Douglas / North Douglas intersections. The project strives to provide the capacity to safely handle the traffic demand for a 20-year design life. The project is needed to address current and future demand/capacity problems during peak morning and afternoon commute times. These problems are causing congestion, delay and excessive queuing at the intersections. Both intersections are also notable for their high accident rates, particularly the Douglas / North Douglas intersection, and warrant safety improvements.

Existing Conditions
The project area is urban in nature. As such, improvement options are constrained by factors such as adjacent development, available right of way (ROW), existing utilities, and existing infrastructure.

Limitations due to existing infrastructure primarily revolve around the Douglas Bridge, a 1286-foot long, 2-lane, cantilevered, post-tensioned, segmental concrete box girder bridge that was constructed in 1981. The bridge is a very unique structure that does not lend itself to significant modification. Replacement of the structure would be very costly.

Previous Study
A major traffic study of this project was completed in June of 2001 by Kittelson and Associates, Inc. for the Alaska Department of Transportation and Public Facilities. Upon completion of the study, the department recommended a partial one way couplet as the preferred engineering solution for the 10th and Egan intersection. An overwhelmingly negative response from project stakeholders, the public, and local government led to the dismissal of the couplet solution. This alternative remains the best solution to solve the congestion problems at the intersection at a reasonable cost and with minimal ROW impacts, and may have to be considered again in the future. This report is a follow up to the traffic study and recommends an alternative solution to the partial one way couplet.

Recommendation

The alternative recommended solution for this project is to widen the 10th and Egan intersection, add a reversible center lane on the bridge, and construct a single lane roundabout at the Douglas / North Douglas intersection. This alternative provides a long-term solution to the congestion problems at the intersections during both the AM and PM peak hours. This solution has the support of local government; therefore, it is recommended that this alternative be advanced for environmental documentation and final design.

1.0 INTRODUCTION

The intersection of Egan Drive and 10th Street is one of the busiest intersections in Southeast Alaska. Virtually all of the vehicles that access downtown Juneau from Douglas Island and the Mendenhall Valley pass through this intersection. Most of the commuters in Juneau make at least one trip through this intersection every workday. The intersection currently serves approximately 28,000 vehicles per day. The intersection experiences substantial peaks in traffic demand during the AM and PM peak hours. The volume of traffic entering the 10th and Egan intersection is resulting in traffic delays and congestion, particularly during the AM and PM peak hours.

Kittleson and Associates, Inc. completed an Alaska Department of Transportation and Public Facilities (department) commissioned traffic study of the project area in June 2001. Upon completion of the study, the department recommended a partial one way couplet as the preferred alternative for the 10th and Egan intersection, with a single lane roundabout at the Douglas Highway/North Douglas Highway intersection.

This alternative would have created a one way couplet out of Egan Drive and Glacier Avenue between the Glacier Spur to the east and 12th Street to the west. The roundabout was popular, but, the partial couplet met an overwhelmingly negative response from project stakeholders, the public, and local government. Increased traffic, increased vehicle / pedestrian conflicts, changes in access to businesses and facilities on Glacier Ave. and 12th Street, and loss of on-street parking were the primary concerns expressed.

This report serves to follow up on the traffic study and will recommend an alternative to the partial one way couplet.

2.0 DESCRIPTION OF EXISTING FACILITIES

2.1 General

The Egan Drive and 10th Street intersection is located in Juneau, Alaska. Juneau is the capital city of the state of Alaska with a population of 30,711 according to the 2000 Census. The City and Borough of Juneau (CBJ) is located in northern Southeast Alaska approximately 570 miles southeast of Anchorage and approximately 970 miles north of Seattle, Washington. Access to Juneau is limited to air and water transportation modes; the community is not accessible by road. Figure 1 depicts the project location in relation to the state of Alaska. The project is located within the downtown area of Juneau. The downtown area contains the core of the federal, state and local government offices, the central business district, as well as numerous businesses and residences. Downtown Juneau is also home to the Juneau harbor and its various cruise ship terminals. These facilities and their adjacent businesses provide the hub for Juneau's tourism industry. Figure 2 depicts the project location in relation to the city of Juneau. Figure 3 and Figure 4 depict the project study area in map and aerial photo format, respectively. Please note that for purposes of this project Egan Drive is considered East - West. The project North arrow in the following figures indicates the direction convention used in this report.

The Egan Drive and 10th Street intersection is a four-way intersection. The South leg of the intersection is the approach to the Douglas Bridge. The Douglas Bridge provides the only road access to Douglas Island. Egan Drive makes up the East and West legs of the intersection. Egan Drive is the principal arterial in the City and Borough of Juneau and is a limited access facility with four driving lanes and left turn lanes. The North leg of the intersection is 10th Street, a two-lane collector roadway.

2.2 History of Facility

The intersection was created as a 3-way intersection in 1969 with the construction of Outer Drive Phase 1. The limits of the Outer Drive Phase I project were 10th Street and Norway Point. The name of the route was changed from Outer Drive to Egan Drive in February 1973. Prior to 1969, access to the Douglas Bridge was via Glacier Avenue and 10th. Following the completion of Phase 1, the primary access to downtown Juneau from the Mendenhall Valley and Lemon Creek was shifted to Egan Drive. The Egan Drive and 10th Street intersection was signalized as part of this project.

The Egan Drive and 10th Street intersection was converted from a 3-way intersection to a 4-way intersection with the completion of Outer Drive Phase II in December of 1973. The limits of Phase II were 10th Street and Main Street. With the completion of Phase II the intersection of 10th and Egan became the primary access to downtown from Douglas and all areas west and south of downtown. The signal system was upgraded and modified to its current 4-way configuration at that time.

The remainder of Egan Drive was completed in 1975. With this link in place, there was a limited access facility all the way from Main Street to the Mendenhall Loop Road. Egan Drive became the primary arterial for the Juneau Borough.

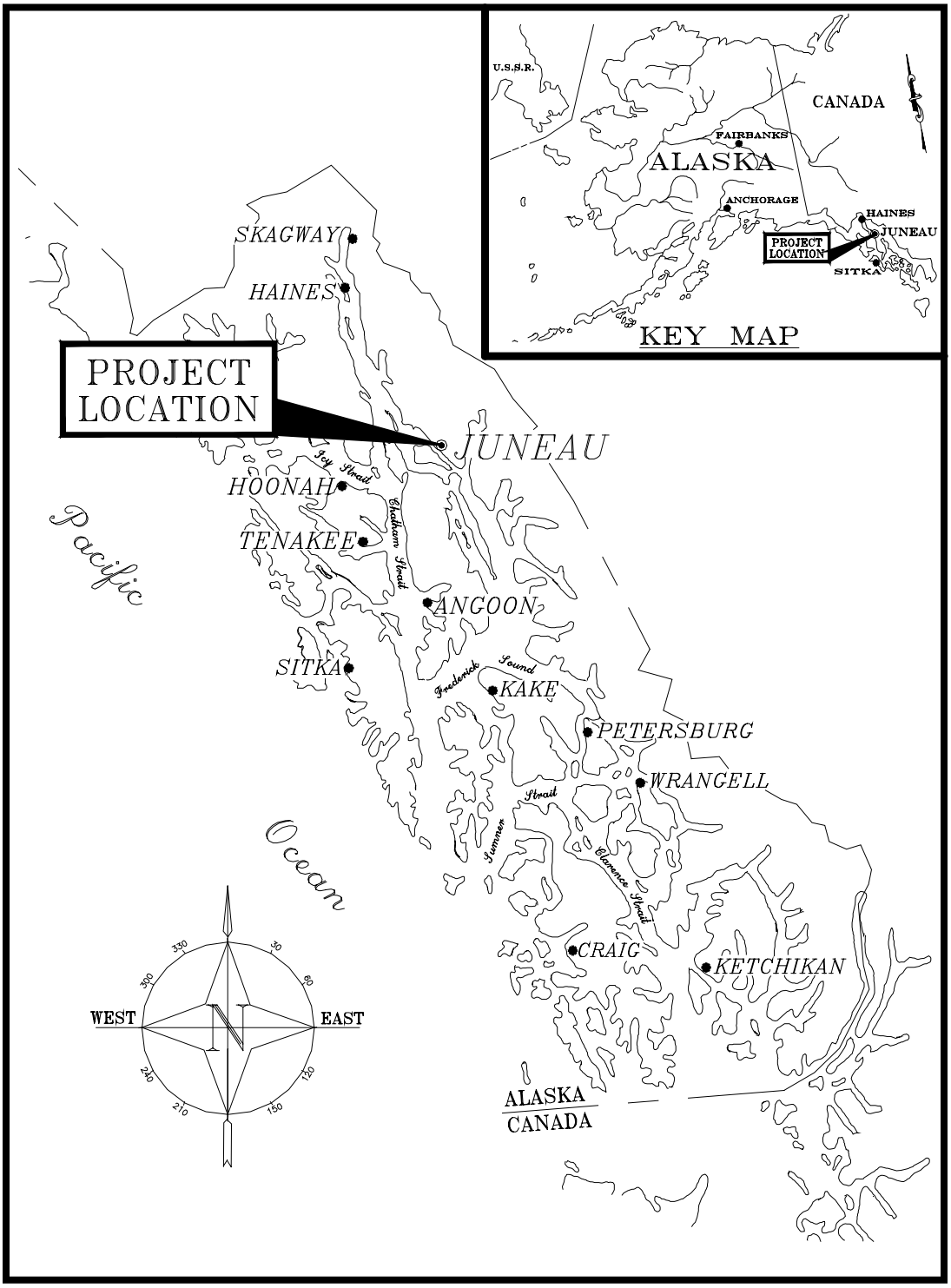


Figure 1: Regional Vicinity Map

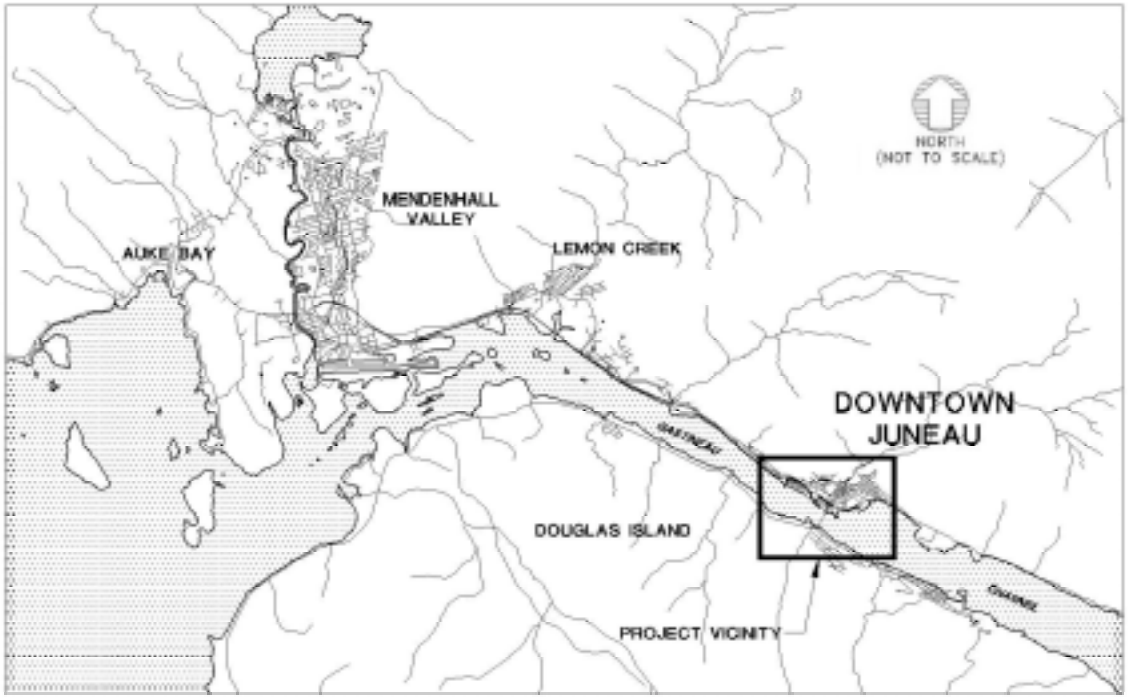


Figure 2: Juneau Area Map

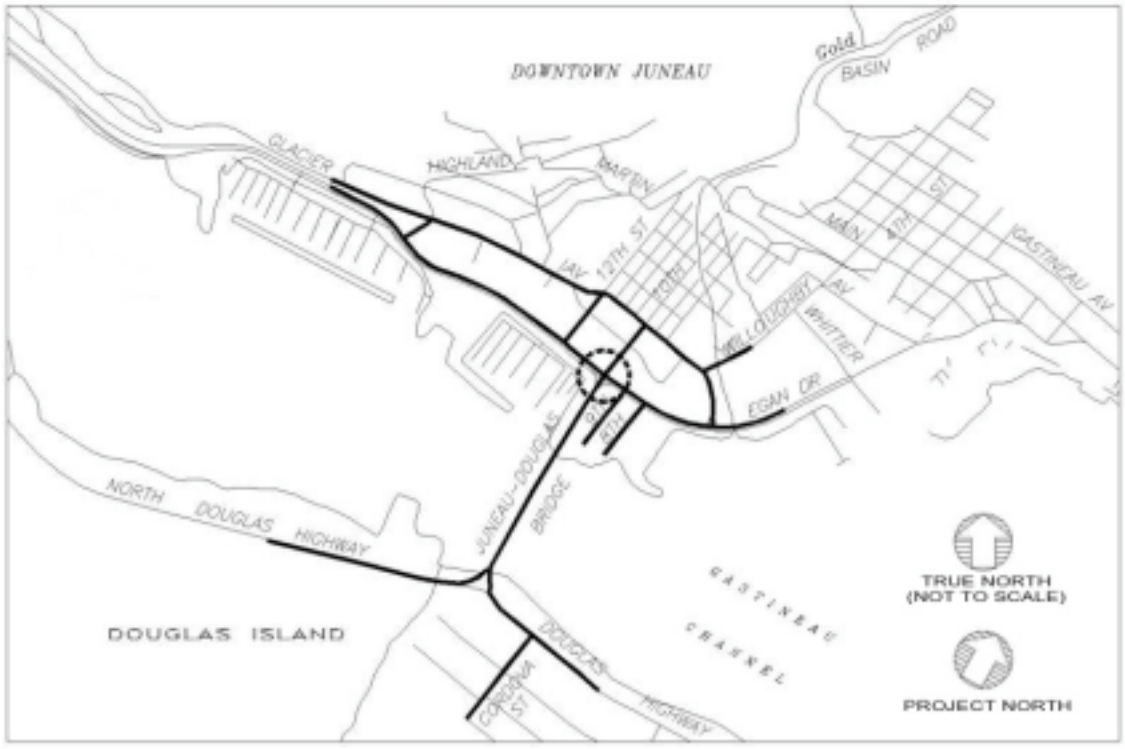


Figure 3: Project Study Area Map

Figure 4: Project Study Area Photo

The Douglas Bridge was first constructed in 1935. The original cantilever, steel truss bridge was replaced with a cantilever post-tensioned segmental concrete box girder bridge in the early 1980's. The bridge replacement project reconstructed the bridge approach at Egan Drive, changing it from two lanes to three lanes. The approaches to the Douglas Bridge and the Douglas Highway/ North Douglas Highway/ Bridge approach intersection were also reconstructed as part of the bridge replacement project. Additional work completed as part of this project included upgrading the traffic signal controller from an electromechanical type to a modern solid state type.

2.3 Previous Studies

Previous studies within the project area include:

- *10th Street and Egan Drive Traffic Study*, March 1995, Alaska Department of Transportation and Public Facilities. Summary of recommendation: Scenario IVC (partial one-way couplet) provides good operational performance and cost performance but has substantial community impact.

- *Douglas Highway Intersection with North Douglas Highway and Cordova Street Traffic Study*, March 1993, Alaska Department of Transportation and Public Facilities. Summary of recommendation: Construct intersection improvements at 10th and Egan intersection. Modify Douglas Bridge to accommodate three lanes of traffic (One lane toward Juneau and two lanes toward Douglas). Do nothing at Douglas Highway and North Douglas Highway and Cordova Street and Douglas Highway intersections, but reevaluate the warrant for signalization at the intersections in five years.
- *Reconnaissance Study, Douglas Highway (Cordova Street to the Douglas Bridge)*, July 1987, Alaska Department of Transportation and Public Facilities. Summary of recommendation: Proceed with alternative 3A - Reconfigure the intersection of North Douglas Highway and Douglas Highway and install conduit for future signalization. Restripe Douglas Bridge to accommodate three lanes of traffic (One lane toward Douglas and two lanes toward Juneau). Do nothing at Cordova Street and Douglas Highway intersection.
- *Gastineau Channel Crossing, Design Study Report*, undated-estimated date:1977, Alaska Department of Transportation and Public Facilities. Summary of recommendation: Construct Alternative A - replace existing Gastineau Channel Bridge (Douglas Bridge) with a cantilevered segmental concrete box girder bridge. The new bridge would be located just east of the existing bridge location.

2.4 Bicycle and Pedestrian Facilities and Usage

Sidewalks are present in the project area on both sides of Glacier Ave., 10th Street, 12th Street, F Street, and Glacier Spur. Egan Drive to the East (downtown side) of the 10th and Egan Intersection has a sidewalk on the upland side and a multi-use pathway along the waterside. To the West (valley side) of the 10th and Egan intersection, sidewalk is present on both sides of Egan Drive. The Douglas Bridge has a sidewalk along the East side which connects to the Egan Drive and Douglas Highway sidewalks. Access to this sidewalk from North Douglas Highway and from Douglas Highway west of the Douglas Breeze-In is hindered by the existing guardrail along the east side of the roadway from the bridge to the Breeze-In parking lot. Pedestrians or cyclists unwilling or unable to climb over the guardrail must go out of their way to make their crossing at the crosswalk near the Breeze-In.

Bicycles are accommodated on the roadway shoulders on most of the roadways within the project area. Egan Drive to the West (valley side) of the 10th and Egan intersection is an access controlled facility; therefore, bicycles are not permitted on the facility and are required to use Glacier Avenue / Glacier Highway. Bicycle access east of 10th and Egan is via the multi-use path on the channel side of Egan Drive. The Douglas Bridge has shoulder bicycle lanes in both directions.

Existing bicycle and pedestrian facilities are shown in Figure 5.

Figure 5: Existing Bicycle and Pedestrian Facilities

2.5 Right of Way

The existing right of way (ROW) widths are variable throughout the project area. The following is a summary of the existing ROW available for this project:

- Egan Drive - right of way is irregular with variable widths from approximately 86' to 174'.
- 10th Street - Glacier Ave to Egan Drive: 54' wide. Some corner widening is present at intersections.
- Glacier Ave -12th Street to Willoughby Ave: 50' wide. Some corner widening is present at intersections.
- Glacier Spur - Willoughby to Egan Drive: variable width from approximately 50' to 200'+
- 12th Street -

  Egan Drive to F Street: 40' wide. Some corner widening is present at intersections.

  F Street to Glacier Ave: approx. 48' wide. Some corner widening is present at intersections.
- Douglas Bridge -

  Juneau approach: right of way is irregular with variable widths from approximately 108' to 182'.

  Bridge section: 250' right of way with 150' on valley side of bridge and 100' on town side.

  Douglas approach: variable

- Douglas Highway -

  Bridge to Cordova Streeet: variable width at bridge approach. Near Cordova Street base ROW width is 70', but localized variations exist.
  Cordova Street towards Douglas: Base ROW width is 60', but localized variations exist.

2.6 Utilities

All major utilities are present within the project area. The project area is urban in nature and the existing utility system is extensive. Underground utilities include water, sewer, telephone, electrical, cable TV, and storm drainage. Overhead utilities include electrical, telephone, and cable TV. Due to the complexity of the existing utility system, this report will not attempt to describe the existing utilities in detail; however, detailed utility plans are available.

2.7 Adjacent Development

The project is located in an urban setting surrounded by substantial development. Development includes residential, commercial, government, and educational uses. Figure 6 identifies major developments within the project area.

Residential development includes the Parkshore Condominium Complex, Mountainview Senior Center, and several residential neighborhoods. The Casey Shattuck neighborhood lies to the north of the project area. The neighborhood is bounded by 12th Street and 8th Street to the West and East respectively and A Street and Glacier Ave. to the North and South respectively. The neighborhood includes approximately 150 houses, as well as churches, businesses and some high density residential properties. Another residential neighborhood, known locally as "The Highlands", is located on the north side of Glacier Ave. between Spruce Street and Highland Drive.

Major commercial properties within the project area include: Breeze-In Grocery, Trucano Construction / Petro Marine Services, Alaska Ship Chandlers, Greatland Hotel, Gold Creek Professional Building, Downtown Union 76, Goldbelt Building, First National Bank, Downtown Tesoro, Alaska Laundry and Dry Cleaners, Harri Plumbing & Heating, Blockbuster Video, and J & J Deli.

Public and governmental developments within the project area include: Federal Building, Alaska Department of Labor building, Alaska Department of Fish and Game building, City and Borough of Juneau (CBJ) public works shop, Juneau Fire Station, CBJ school system district offices, Harris Harbor and Aurora Harbor.

Educational facilities within the project area include: Juneau-Douglas High School, Yaakoos Alternative High School (located on 2nd floor of Harri Plumbling & Heating building), Marie Drake Middle School (currently inactive), Harborview Elementary School, University of Alaska Southeast (UAS) Marine Technical Center, and UAS Bill Ray Center.

Figure 6: Adjacent Development

2.8 Police, Fire, Emergency Medical Services

The Juneau Police Department has law enforcement jurisdiction over the project study area. The Juneau Police Department's dispatch personnel (Contact number: 586-0600) are the contact for all law enforcement matters.

The Juneau Fire Station is located within the project study area at 820 Glacier Avenue. This station is equipped with 2 fire engines, 1 ladder truck, 2 ambulances, and 1 utility truck. The station is staffed with 4 firefighters/ medics on duty 24 hrs/day as well as many on-call volunteers. The station provides fire and emergency medical response to all of Douglas Island

and the community of Juneau from Thane to Vanderbilt Hill. The primary response route is left on Glacier Ave, left onto 10th Street, then over the Douglas Bridge to Douglas Island or onto inbound/outbound Egan Drive, depending on the location of the call. Calls in close proximity to the station (Centennial Hall and closer) are responded to via Glacier Ave. / Willoughby Ave. Juneau Fire Chief Mike Doyle or Division Chief Mike Fenster (Contact number: 586-5322) are the contacts for the Juneau Fire Station.

2.9 Environmental

The general environment of the 10th and Egan project area is urban. Development has occurred within most of the project area and little natural environment exists. Gastineau Channel and several streams that exist within the project area have been impacted to a lesser extent than the surrounding area. The majority of the project area on the Juneau side is constructed on rock fill that was produced from the AJ mine operations in the early 1900's. Additional fill was placed to construct Egan Drive / Outer Drive through the project area in the 1960's & 1970's.

Two catalogued anadromous fish streams exist within the project area. Chum and pink salmon are present in Gold Creek (Alaska Department of Fish & Game catalogued fish stream no. 111-40-10200). This creek was channeled through a concrete flume in the 1950's to alleviate flooding. As the channel was narrowed, the velocities in the stream increased and fish passage was made more difficult. It is anticipated that any further channelizing of the stream would be viewed unfavorably by resource agencies. Gold Creek discharges into the Gastineau Channel on the Juneau end of the bridge near the east edge of the project area. At the point of its discharge a delta has formed which is heavily used by waterfowl.

Kowee Creek is located on the Douglas end of the bridge near the west edge of the project area. This creek is used for spawning by both pink and chum species of salmon.

There are no known wetlands on the Juneau side of the project within the study area. There may be some forested wetlands along North Douglas Highway. The project study area was not included in the *Juneau Wetlands Management Plan* dated February 1997; therefore, no wetlands fall within planning authority of the City & Borough of Juneau. Any potential wetlands along North Douglas Highway are under the jurisdiction of the U.S. Army Corps of Engineers (COE). None of the alternatives currently under considerations would impact wetlands.

There is intertidal habitat on both sides of Gastineau channel. Endangered Humpback Whales and threatened Steller Sea Lions are known to use Gastineau Channel. The range of the American Peregrine Falcon, Northern Goshawk, and Harbor Seals, identified as State of Alaska species of special concern, are within the project area. Numerous other mammals and birds use the channel and intertidal areas. None of the current project alternatives would affect the above mentioned animal species.

2.9.1 Permits

No permits would be required for the currently proposed alternatives. The following permits would be required if work expands into jurisdictional areas:

- Work below Ordinary High Water (OHW) at Gold and Kowee Creeks would require authorization from the Alaska Department of Fish and Game (ADF&G) and Corps of Engineers (COE). Both creeks, as cataloged anadromous fish streams, would require an Essential Fish Habitat (EFH) assessment for any proposed actions. In-water work windows and mitigation would also be required.
- Modifications to the Douglas Bridge affecting navigation beneath the bridge would require authorization from the U.S. Coast Guard.
- Any proposed fill in Gastineau Channel, including intertidal areas, would require COE authorization, an EFH assessment and an evaluation of Threatened and Endangered Species and other species present. In-water work windows and mitigation would also be required.

2.10 Transit

The project area is served by Capital Transit bus service. The following roadways within the project area are on the current bus route: Glacier Ave, Willoughby Ave, Egan Drive, 12th Street, 10th Street, F Street, Douglas Bridge, and Douglas Highway (North and South). Popular origins and destinations within the project area include the Federal Building, Bill Ray Center (UAS), Mountainview Senior Center, and the A & P Market. The Federal Building stop serves as the downtown transfer point for passengers transferring to a different route.

Capital Transit is currently studying the feasibility of a Downtown Juneau Transit Center. Several sites within the project area are being considered for this facility. A new transit center would likely change the routing of busses through the project area. It is anticipated that they would still be required to use the project area intersections to a similar extent that they are used today, therefore, the construction of a new downtown transit center is not anticipated to have a significant effect on the selected alternative.

2.11 Bridges

Four bridges exist within the project area, the Douglas Bridge (bridge no. 740), the Kowee Creek Bridge on North Douglas Highway (bridge no. 870), the Gold Creek Bridge on Willoughby Ave. (bridge no. 315), and the Gold Creek Bridge on Egan Drive (bridge no. 732).

The Douglas Bridge plays a critical role in this project. The bridge and its approaches comprise the sole link between the 10th and Egan intersection, and the Douglas / North Douglas intersection. The bridge itself makes up over half of the total distance. The bridge provides the only road connection between the town of Juneau and Douglas Island. The properties of the bridge are as follows:

Year Constructed:	1981
Width of Roadway (rail to rail):	36' (2-12' lanes, 2- 6' shoulders)
Width of Pedestrian Sidewalk:	6'
Width of Entire Bridge Deck:	44'
Length of Bridge:	1286'
Navigation Window:	250'w x 50'h
Channel Span:	620'

The Douglas Bridge is a cantilevered, post-tensioned, segmental concrete box girder structure. This type of construction is unique and as such it minimizes the feasibility of modifications to the structure. Concerns regarding modifications to the structure include the ability of the structure to handle additional loading, potential for damage to the structure during construction (specifically to the abundant reinforcement hidden within the concrete structure), traffic impacts during construction, and the costs associated with the modifications. The ADOT/PF Bridge Design Section has stated that retrofits to this structure would likely result in significant cost, legal disputes, and impacts to the travelling public.

The expansion joints in the Douglas Bridge are in poor condition and the Bridge Design section has recommended they be replaced. This repair should be completed as part of this project regardless of the alternative selected.

Statewide planning has also requested that we consider adding pavement sensors to the bridge deck and north (Juneau) approach to provide the following information:

- Surface temperatures
- Subsurface temperatures (of approach embankment)
- Surface chemical concentration and calculated freeze point

The information would better inform the maintenance crew of the timing and need for deicing efforts. It would benefit the preferred alternative and should be completed as part of this project.

The remaining three bridges in the project area are much smaller and therefore more feasible to modify or replace. The basic properties of those bridges are shown in Table 1.

Table 1: Bridge Properties

	Kowee Creek Bridge	Gold Creek Bridge (Egan Drive)	Gold Creek Bridge (Willoughby Ave.)
Year Constructed:	1981	1972 widened in 1998	1934
Bridge Number:	870	732	315
Width:	36'	78'	28'
Length:	115'	120'	48'
Bridge Type:	Prestressed Concrete Bulb Tee	Prestressed Concrete Box Girder	Concrete Girder

3.0 PUBLIC INVOLVEMENT

During the development of the Kittelson traffic study and the DOT&PF's supplemental study, numerous meetings were held to gather and disseminate information on the project. This section describes the meetings held, the public input received, and the media coverage received regarding the project.

3.1 Public and Stakeholder Meetings

Many meetings were held with the public or project stakeholders. The meetings are summarized below:

Topic: 10th and Egan Project / Display of draft alternatives / Requesting public input on problems and solutions		
Stakeholder: Public		
Date: 10/25/00	**Time:** 4:00PM to 7:00 PM	**Location:** Egan Room at Centennial Hall
Attendants: Approx. 12 citizens, DOT&PF Staff, Kittelson Staff.		
Summary: Are there any TDM solutions that could solve the problem? Concerns expressed over bicycle and pedestrian access through the intersection and over the Douglas Bridge.		

Topic: 10th and Egan Project / Announcement of proposed solution (partial one-way couplet)		
Stakeholder: Public		
Date: 1/24/01	**Time:** Noon-1PM and 4:30PM to 7:30 PM	**Location:** Egan Room at Centennial Hall
Attendants: Approx. 46 citizens, DOT&PF Staff, Kittelson Staff.		
Summary: Open house meeting where public could view the proposed alternatives and ask questions of project team. In addition to the open house, Kittelson and DOT staff made presentations of final four solutions that were investigated in detail as part of the traffic study (reversible lane, close 10th Street, interchange with Egan Drive under 10th, and the partial one-way couplet). The partial one-way couplet solution was presented as the preferred engineering solution with the reversible lane as the "back up" solution. There was little acceptance of the couplet solution by the public present. Some questioned the extent of the problem; i.e., "It's only a problem for 15 minutes a day"		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: Mountainview Senior Center		
Date: 1/30/01	**Time:** 1:30PM	**Location:** Mountainview Senior Center
Attendants: Ellen Northrup (Mountainview Senior Center), Amy Highly (AHFC), Pat Carroll (ADOT&PF), Chris Morrow (ADOT&PF)		
Summary: Do not like the couplet solution. Concerns with high volumes of traffic, higher speeds, noise impacts to center residents on 12th Street side of building, access to center compromised w/ conversion of 12th Street to one way,		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: Juneau Fire Department		
Date: 2/7/01	**Time:** 2:00 PM	**Location:** Juneau Downtown Fire Hall
Attendants: Mike Doyle (Juneau Fire Chief), Mike Fenster (Division chief), Pat Carroll (ADOT&PF)		
Summary: Concerned about increased traffic on Glacier Ave in front of the station as a result of the couplet solution. Response time to Willoughby Street addresses (between fire station and Centennial Hall) will increase with couplet solution.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: Casey-Shattuck Neighborhood Association		
Date: 2/12/01	**Time:** 6:30-8:30 PM	**Location:** Juneau Downtown Fire Hall
Attendants: Approx. 37 citizens from Casey-Shattuck Neighborhood, DOT&PF Staff, CBJ Staff (Heather Marlow)		
Summary: Many concerns expressed regarding the couplet solutions impacts to the Casey Shattuck Neighborhood. Concerns included: increased traffic on local streets as drivers try to avoid or circumnavigate the couplet, increased noise due to increased traffic, increased potential for vehicle / pedestrian conflicts (especially children).		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: Goldbelt Building		
Date: 2/13/01	**Time:** 3:00 PM	**Location:** Riker & Associates Office
Attendants: Tracy Riker (Riker & Associates, Goldbelt Building Property Manager), Pat Carroll (ADOT&PF), Chris Morrow (ADOT&PF)		
Summary: Building is very limited in locations for loading and unloading. There is a loading dock, but internal access to loading dock is limited to the tenant of that space (1st floor), loading and unloading for all other building occupants is through main entrance on 10th Street. Currently only 4 parking spaces in front of building at 10th Street entrance.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: CBJ Capital Transit (John Kern)		
Date: 2/16/01	**Time:** 11:00 AM	**Location:** DOT 7-mile Conf. Room
Attendants: John Kern (Capital Transit), Pat Carroll (ADOT&PF), Chris Morrow (ADOT&PF), Julianne Motis (ADOT&PF)		
Summary: Couplet solution would be disruptive to existing transit system. Close 10th option probably the least disruptive to transit system. Existing transfer location at the Fed. Bldg. is less than ideal, as passengers must cross Glacier Ave to complete bus transfer. New downtown transit could be new transfer station but is not a sure thing, more study and planning is required. Mountain View Senior Center, A&P Market, Fed. Bldg, Bill Ray Center, and Goldbelt Bldg. are all big origin and destinations for transit passengers.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Stakeholder: Federal Building		
Date: 2/28/01	**Time:** 9:30 AM	**Location:** Federal Building Rm. 417
Attendants: Tim Essebeggers (Property Manager), Ruby Walker (Asst. Property Manager), Pat Carroll (ADOT&PF), Chris Morrow (ADOT&PF)		
Summary: Concerned that couplet may cause a diversion of traffic though their parking lot and the adjacent neighborhood streets. Concerned w/ access to post office. They have tried TDM incentive programs in past and have not been successful. The Fed. Bldg. does not have enough parking for all who work there, latecomers are forced to find parking outside of the parking lot (IE: the neighborhood streets). Willing to work w/ city on a parking program to reduce this problem. Capital Transit bus stop @ Fed. Bldg. is maintained by GSA but is owned by CBJ.		

Topic: Reversible Lane preferred engineering solution		
Stakeholder: Public		
Date: 7/25/02	**Time:** 4:30-8:30 PM	**Location:** Egan Room at Centennial Hall
Attendants: Approx. 32 citizens, DOT&PF Staff		
Summary: Most objected to removing the bicycle lanes and were opposed to any change that might increase bicycle traffic on the shared use sidewalk. Several experienced riders said the proposed 3' shoulder width was inadequate, that they would have to ride in the middle of the traffic lanes rather than risk getting squeezed against the railing. Most seemed to accept there was a traffic problem but some doubts were expressed regarding the reversible lane concept and whether traffic was bad enough to warrant such a solution. Several suggested that TDM measures be tried first and one suggested that the project be phased in rather than built all at once. Most seemed to like the roundabout and a few expressed their support for the entire proposed design.		

Topic: Reversible Lane on Douglas Bridge		
Stakeholder: Juneau Freewheelers		
Date: 10/17/02	**Time:**	**Location:** DOT 7-mile
Attendants: Chris Morrow (ADOT&PF) and Dave Ringle, club president		
Summary: Presented the latest proposed typical section (7.5' multi-use path, removal of all shoulders). Dave said the Freewheelers would oppose any solution that reduces the existing bike lanes, said this is contrary to national and state policies to promote bicycle use.		

3.2 CBJ Government Meetings

Project staff participated in meetings with local government agencies or officials. The meetings are summarized below:

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Gov't Body: CBJ Schools		
Date: 2/20/01	**Time:** 9:30 AM	**Location:** MRV Architects Office
Attendants: Joe Mueller (Facilities Manager Juneau School District), Paul Volkers (MRV Architects), Pat Carroll (ADOT&PF), Chris Morrow (ADOT&PF)		
Summary: Discussed the School Systems plans for the future of the Harborview, Marie Drake, High School Area. Very concerned with impacts the couplet will have to the school area. Increased traffic along 12th Street and parking losses are primary concerns. Of the options presented the reversible lane is the one they prefer.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Gov't Body: CBJ School Board Facilities Committee		
Date: 2/27/01	**Time:** 12:00 AM	**Location:** CBJ Schools Central Office Board room
Attendants: CBJ School Board facilities committee: Chuck Cohen, Stan Ridgeway, Mary Becker **AKDOT:** Chris Morrow, Pat Carroll, Julianne Motis **Other:** Keith Gerken (UAS), Joe Mueller (CBJ School District facilities manager), Debbie Lewis (meeting recorder), Deb Morris (JDHS principal), Gary Bader (CBJ schools superintendent), Bob Dye (Harborview School principal), Unknown (ABG bus lines)		
Summary: Presented 10th and Egan four final alternatives and couplet at the preferred engineering solution. The attendants were very concerned with the couplet solution. Fearful of increased accident between peds (students) and cars due to 10 fold increase in traffic on Glacier Ave. and 12th. Alternative High School (approx 100 students) is located across 12th street, upstairs in Harri Plumbing building, heavy traffic on 12th will pose quite a barrier for students. Loss of available parking on 12th Street makes their existing parking shortage even worse. They expressed concerns with drivers using local street network to avoid all of the new signals on Glacier Ave.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Gov't Body: CBJ Planning Commission, CBJ Public Works and Facilities Committee		
Date: 2/27/01	**Time:** 6:00 PM	**Location:** Assembly Chambers
Attendants: CBJ: members of CBJ Planning Commission and CBJ Public Works and Facilities Committee **AKDOT:** presenting- Pat Carroll, Chris Morrow, Julianne Motis. In audience- Pat Kemp, Mike Downing, Bob Doll		
Summary: Presented the 10th and Egan project to the planning commission and the PWFC at a joint meeting. Presented the existing problems and what is predicted if nothing is done, proposed solutions, relative performance of the solutions, and a section on Transportation Demand Management (TDM) and reasons why it is not a feasible solution. Many concerns about the couplet were expressed by panel members and by the public in attendance. Ensuing public statements by assembly members made it clear that this solution was not acceptable.		

Topic: 10th and Egan four final alternatives / partial one way couplet preferred engineering solution		
Gov't Body: CBJ Officials and Staff		
Date: 2/27/01	**Time:** 12:00 AM	**Location:** Downtown Library Conference Room
Attendants: CBJ: Sally Smith, Dave Palmer, Sheryl Easterwood, Tim McGuire, Heather Marlowe, John Stone, Rorie Watt, Ernie Mueller, John Kern, Mike Scott, Wayne Stouffer. **AKDOT:** Bob Doll, Pat Kemp, Chris Morrow, Pat Carroll, Julianne Motis		
Summary: Presented the 10th and Egan four final alternatives and the couplet preferred engineering solution. Explained the process that was used to come to the recommended solution. Answered many questions from CBJ staff and officials regarding the alternatives and the decision making process used to arrive at the preferred solution.		

Topic: 10th and Egan project update reversible lane as preferred engineering solution		
Gov't Body: CBJ Public Works and Facilities Committee		
Date: 5/15/02	**Time:** noon-1PM	**Location:** Assembly Chambers
Attendants: CBJ: members of Public Works and Facilities Committee **AKDOT:** Chris Morrow, Pat Carroll		
Summary: Presented powerpoint presentation on the 10th and Egan project and specifically the reversible lane and roundabout preferred engineering solution. Gave a general project update to the committee. Answered questions from committee members regarding the preferred solution.		

Topic: 10th and Egan project reversible lane as preferred engineering solution		
Gov't Body: CBJ Planning Commission		
Date: 12/10/02	**Time:** 7PM	**Location:** Assembly Chambers
Attendants: CBJ: members of CBJ Planning Commission **AKDOT (presenting):** Chris Morrow, Pat Carroll **(in audience):** Pat Kemp, Pete Bednarowicz, Victor Salemann (David Evans & Associates), Linda Snow (Southeast Strategies)		
Summary: Presented powerpoint presentation on the 10th and Egan project and specifically the reversible lane and roundabout preferred engineering solution. Approx. 11 members of public testified: 1 person spoke in favor of project, 9 people spoke in opposition to project for primarily bicycle reasons, 1 person spoke in opposition to project for primarily vehicular reasons. **Planning commission approved the project by a vote of 5 in favor, 3 opposed.**		

3.3 Public Comments

Comments were received from over 100 individuals or businesses. Comments were received by mail, email, on comment forms given out at public meetings, or by telephone. The majority of comments received were in response to the announcement of the partial one way couplet as the engineering preferred solution. The comments were mostly negative toward the proposed solution. Many concerns were expressed regarding the solution, the most common reasons stated for the opposition to the solution being:

- Increased traffic on Glacier Ave / 12th Street and the related noise and air pollution impacts to the adjacent neighborhood.
- Increased pedestrian conflicts with increased traffic, especially concerned with the safety of the elderly and school children using the route.
- Access to Mountainview Senior center would be compromised. 12th Street converted to one way would not allow the safe and convenient drop offs and pickups by the Care-a-Van and other vehicles.
- Takes away parking in an area that is already short on parking.

Following the announcement of the reversible lane alternative the most common comments received were:

- Oppose removal of bike lanes
- Oppose any reduction in bike lane width
- Oppose adding more bicycle traffic on the sidewalk
- Bicycles will impede motorists
- Question the urgency of action
- Try TDM instead
- Build another channel crossing

The public comments concerning the partial couplet generally dealt with neighborhood impacts while the comments received regarding the reversible lane generally identified traveler concerns (primarily impacts to bicyclists). A summary of all comments is included in Appendix A.

3.4 Media Coverage

Following the release of the partial one way couplet solution and later the reversible lane solution, the project received significant coverage by the local media. The project was covered by the local newspaper, and by local radio stations. Project staff were interviewed by both newspaper and radio reporters. In addition to the feature stories, the newspaper also published editorials, letters to the editor, and word of mouth entries (phone in comments) regarding the project. Copies of the newspaper articles are included in Appendix B. Where possible the original article is included. Where the original article was not available a facsimile as downloaded from the newspaper's web site has been included.

4.0 PRELIMINARY PURPOSE AND NEED

4.1 Purpose

The purpose of the project is to improve capacity at the Egan Drive/10th Street (Egan/10th) and the Douglas Bridge/North Douglas Highway/Douglas Highway intersections, and to improve safety for motorists, bicyclists and pedestrians traversing these intersections. The improvements will provide capacity to safely manage the traffic demand for a 20-year design life.

4.2 Need

These intersections are currently experiencing demand/capacity problems during peak commute times in the morning and/or late afternoon. This is causing congestion, delay and queuing at all intersections. Additionally, the congestion appears to be contributing to a pattern of accidents at these intersections. Traffic is projected to increase by approximately 35% over the next 20 years. The additional traffic will greatly exacerbate the problems seen today.

4.3 Backup Information

4.3.1 Capacity

The Department has observed conditions that indicate the intersections are at or have exceeded capacity. The Department has inventoried current traffic demand and has forecast traffic demand for the project design year 2022. As reported in the Juneau Area Wide Transportation Plan (AWTP), traffic volumes are expected to grow approximately 1.5% per year, or approximately 35% over the next 20 years based on projected population and employment growth. Existing traffic data was used to perform analyses based on ADOT&PF and USDOT Research Board procedures that concluded the intersections are approaching or have exceeded their capacities. The analysis results in a level of service indicator that is used to describe the operation of an intersection. The following narrative describes the observed conditions and the existing and forecast level of service analyses conclusions.

4.3.1.1 Observed Conditions

The saturated conditions at Egan/10th result in extensive queues during the morning peak commute hour on the Juneau-bound Douglas Bridge approaches that back-up and affect the operation of intersections on Douglas Highway. Queues typically extend for several hundred feet east of the Cordova Street /Douglas Highway intersection during the morning commute. During the morning peak commute hour, the North Douglas Highway/Douglas Highway intersection operates with alternating priority between the traffic streams approaching the bridge from the east and west regions of Douglas Island. The result is a better level of service for traffic from North Douglas Highway, at the expense of additional delay to traffic from Douglas Highway.

Similarly, extensive queuing occurs on the west and south legs of the 10th and Egan intersection in the morning, with extensive queuing on the north and east legs of the intersection in the evening. Additional queuing occurs on 10th Street during the evening peak hour that extends

back to and along Glacier Avenue. This bottleneck interferes with the normal operation of intersections neighboring Egan/10th.

4.3.1.2 Existing and Future Level of Service

Level of service (LOS) for intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. LOS for signalized intersections is determined by the average stopped delay for all entering vehicles; whereas LOS for unsignalized intersections is determined by the average stopped delay for the most time-consuming maneuver -- usually a left turn. Level of service criteria are presented in Table 2 and Table 3 below.

Table 2: Level of Service Definitions for Signalized Intersections

Level of Service (LOS)	Average Stopped Delay per vehicle (seconds)	Effect
A	≤5	Most vehicles aren't stopped
B	5.1 to 15.0	Low delay
C	15.1 to 25.0	Significant no. of stopped vehicles
D	25.1 to 40.0	Noticeable congestion and occasional cycle failure
E	40.1 to 60.0	Limit of acceptable delay and frequent cycle failure*
F	> 60.0	Unacceptable delay

*Cycle failure: When motorists wait more than one cycle to clear a signalized intersection.

Table 3: Level of Service Definitions for Unsignalized Intersections

Level of Service (LOS)	Average Total Delay per vehicle (seconds)
A	≤5
B	5 to 10
C	10 to 20
D	20 to 30
E	30 to 45
F	> 45

Table 4 below presents the existing and future, morning and evening levels of service for the two intersections included in this project scope.

Table 4: Existing and Future, Morning and Evening, Levels of Service

Intersection	Existing Condition (2000)		Future Condition (2022)	
	A.M.	P.M.	A.M.	P.M.
Egan/10th	F	E	F	F
N. Douglas/Douglas Highway	F	F	F	F

Note: Only Egan/10th is signalized.

4.3.2 Safety

Accident data for the year 1997 through 1999 are presented in order to evaluate the safety of the study intersections. Table 5 summarizes the accident data and the calculated accident rates for the two intersections.

Table 5: Intersections Accident Type

Intersection	By Type				Σ	Average Daily Entering Vehicles	Unweighted Accident Rate (per MEV)
	Property Damage Only	Minor Injuries	Major Injuries	Fatality			
Egan/10th	15	8	0	0	23	36,930	0.57
N. Douglas/Douglas	4	4	2	0	10	15,300	0.60

Note: Unweighted: the rate is not weighted by accident severity.
MEV: million entering vehicles

For the 3-year period of January 1997 through December 1999, no fatal accidents occurred at the two study intersections. Furthermore, only two accidents with major injures were reported, both of them at the North Douglas/Douglas Highway intersection.

Egan/10th has experienced the higher number of accidents of the two intersections. Table 6 presents the detailed accident type by year. Most of the accidents were rear end and angle type. The high number of rear end accident, in particular on the Douglas Bridge, but also on the other approaches, may be related to the queuing problem at the intersection and may be reduced by improving the operation of the intersection.

Table 6: Accident History for Egan/10th

Year	Accident Type						Total
	Rear End	Head On	Angle	Parked	Pedestrian	Other	
1997	4	0	1	0	0	1	6
1998	5	0	3	0	1	0	9
1999	4	0	4	0	0	0	8
Total	13	0	8	0	1	1	23

The North Douglas /Douglas Highway intersection had the higher accident rate; i.e., the number of accidents per number of entering vehicles. Vehicles turning left from North Douglas

Highway towards the bridge were involved in all five angle-type accidents. It appears that the majority of these accidents may be attributable to a lack of sufficient gaps for left turning eastbound North Douglas Highway traffic. Table 7 presents the accident history for North Douglas/Douglas Highway.

Table 7: Accident History for N. Douglas/Douglas Highway

Year	Accident Type						Total
	Rear End	Head On	Angle	Parked	Pedestrian	Other	
1997	0	0	2	0	0	0	2
1998	1	0	3	0	0	0	4
1999	1	0	1	0	0	2	4
Total	2	0	6	0	0	2	10

4.3.2.1 Comparison to other Southeast Region Intersections

Table 8 shows the most critical intersections in southeast Alaska, in terms of total number of accidents recorded over the past three years of published data (ADOT&PF Traffic and Safety Report, 1999). The list includes all Southeast intersections where ten or more accidents were recorded. Rankings are shown for total accidents, intersection traffic volumes, and accident rate. The information in this table is provided for the purpose of comparing to other intersections in SE region. The data was compiled differently from that reported above and therefore the above data and that reported in the table below do not match.

Table 8: Southeast Alaska Intersection Accident Comparison

ACCIDENTS AT HIGH VOLUME INTERSECTIONS (1997-1999)							
		3-Year		**Intersection**		**Weighted Accident**	
City	**Intersection**	**Total Acc**	***Rank***	**ADT**	***Rank***	**Rate ***	***Rank***
Juneau	**Douglas/N.Douglas**	**11**	***20***	**14,866**	***17***	**4.85**	***1***
Juneau	Egan/Vintage	21	*6*	15,385	*16*	4.81	*2*
Juneau	Riverside/Vintage	17	*9*	18,619	*13*	3.58	*3*
Juneau	Lemon/Sunny Point	17	*8*	13,828	*19*	3.50	*4*
Juneau	Thane/Main	14	*14*	14,661	*18*	3.36	*5*
Sitka	Halibut Pt. Rd/Brady	10	*22*	12,675	*22*	3.31	*6*
Juneau	Egan/Vanderbilt	27	*3*	27,226	*6*	3.19	*7*
Juneau	Egan/McNugget	30	*2*	35,958	*1*	3.00	*8*
Juneau	Egan/Mend Loop	39	*1*	35,153	*2*	2.99	*9*
Ketchikan	S.Tongass/Main	11	*19*	13,326	*20*	2.67	*10*
Juneau	Loop/Atlin/Mall	25	*5*	27,046	*7*	2.60	*11*
Ketchikan	S.Tongass/Jefferson St	25	*4*	22,211	*10*	2.51	*12*
Juneau	Loop/Mend. Blvd.	14	*13*	12,983	*21*	2.39	*13*
Ketchikan	S.Tongass/Dock	11	*21*	18,595	*14*	2.31	*14*
Juneau	Egan/Highland	17	*10*	25,162	*8*	1.92	*15*
Juneau	Egan/Salmon Crk	20	*7*	27,312	*5*	1.87	*16*
Juneau	Egan/Sunny Drive	16	*11*	29,581	*4*	1.85	*17*
Ketchikan	S.Tongass/Washington	13	*17*	20,476	*11*	1.83	*18*
Juneau	Egan/12th	14	*16*	24,629	*9*	1.71	*19*
Juneau	Thane/Willoughby	14	*15*	15,424	*15*	1.54	*20*
Juneau	**Egan/10th**	**16**	***12***	**30,235**	***3***	**1.21**	***21***
Ketchikan	S.Tongass/Grant	12	*18*	19,845	*12*	0.74	*22*

* Accident Rate = Number of accidents per 1 million entering vehicles

5.0 ALTERNATIVES

The 10th and Egan Traffic Study Report recommended the partial one way couplet as the preferred engineering alternative for the 10th and Egan intersection. This alternative would create a one way couplet out of Egan drive and Glacier Avenue between the Glacier Spur to the north and 12th Street to the south. The couplet alternative was dismissed due to a negative response from project stakeholders, the public, and local government. This alternative remains the best solution to solve the congestion problems at the intersection at a reasonable cost and with minimal ROW impacts, and may have to be considered again in the future. The reader is directed to the 10th and Egan traffic study for a detailed description and analysis of this alternative.

Following the dismissal of the couplet alternative, the Department considered three other action alternatives for the 10th and Egan intersection. Two of the alternatives considered were conceived during the traffic study, but were either not advanced for further study or were studied but not selected as the preferred alternative. The alternatives considered are as follows:

- No Build
- Roundabout at 10th and Egan (scenario IIA from traffic study)
- Widen existing Intersection with reversible lane on bridge (scenario IC from traffic study)
- Add auxiliary lanes to existing intersection (new alternative)

Alternatives for the Douglas Highway/ North Douglas Highway intersection were considered independently of the 10th and Egan alternatives. The alternatives considered for the Douglas Highway/ North Douglas Highway intersection are as follows:

- No Build
- Roundabout at Douglas / North Douglas (scenario VB from traffic study)
- Signalize intersection in its existing configuration (scenario VA from traffic study)
- Reconfigure and signalize intersection (new alternative)

5.1 10th and Egan Alternatives

5.1.1 No Build Alternative

The no-build alternative for the 10th and Egan Intersection Improvements Project consists of maintaining the roadways and the current configuration of the 10th and Egan intersection.

5.1.2 Roundabout at 10th and Egan

This alternative would replace the existing signalized intersection with a multi-lane roundabout. Variations of the roundabout configuration were investigated, including changes in number of lanes, the inscribed circle diameter, and approach geometry. The most desirable variation would construct a 187-foot diameter double lane roundabout with a partial third lane added to accommodate Egan Drive outbound through traffic. To accommodate design year traffic volumes, right turn bypass lanes would be required in all but the northeast quadrant of the

intersection (Egan outbound to 10th Street). The bypass lanes would not be required initially and could be constructed in later years as needed. The roundabout alternative is depicted in Figure 7.

5.1.3 Widen Existing Intersection with Reversible Lane on Bridge (Preferred Alternative)
This alternative was advanced and studied in detail during the traffic study process. The solution was a runner up to the couplet as the preferred engineering solution. A detailed description and analysis of this alternative is included in sections 4 and 5 of the June 2001 traffic study report; the reader is directed to that document for additional information. This alternative would widen the approaches to the intersection and convert the Douglas Bridge from two to three lanes. The center lane north of the bridge's crest vertical curve would be reversible, flowing toward Juneau during the morning peak hours and toward Douglas for the remainder of the day. New overhead changeable legend (red X and green arrow) signs would control the reversible lane operation over the bridge. Overhead changeable legend lane control signs (left turn only, lane closed, etc) would be used to control the use of turn lanes on the east Egan Drive (Downtown), 10th Street, and Douglas Bridge approaches to the 10th and Egan intersection.

Figure 8 and Figure 9 show the anticipated AM signing configuration for this alternative. The PM configuration is shown in Figure 10 and Figure 11. The configuration of the 10th/Egan intersection is shown in Figure 12.

5.1.4 Add Auxiliary Lanes to Existing Intersection
This is a new alternative that was developed after the traffic study. This alternative would involve the addition of acceleration, turn, and through lanes to the 10th and Egan intersection. The 10th Street approach to the intersection would be widened to allow the addition of a dedicated right turn lane to outbound Egan Drive. To make this right turn a free flowing movement, an acceleration lane would be added to Egan Drive from 10th Street to approximately 300' beyond the intersection of 12th Street and Egan Drive. On the bridge approach leg of the 10th and Egan intersection a new dedicated through lane would be added. In addition, the length of the full width portion of the existing right turn lane would be extended back toward the bridge abutment. The lane extension would be accomplished by reducing the length of the existing taper into the lane. The result would be a sharp taper into the right turn lane beginning right at the end of the Douglas Bridge. An acceleration lane would be added to Egan Drive from the bridge approach to approximately 300 feet beyond the 8th Street and Egan Drive intersection. This alternative is depicted in Figure 13.

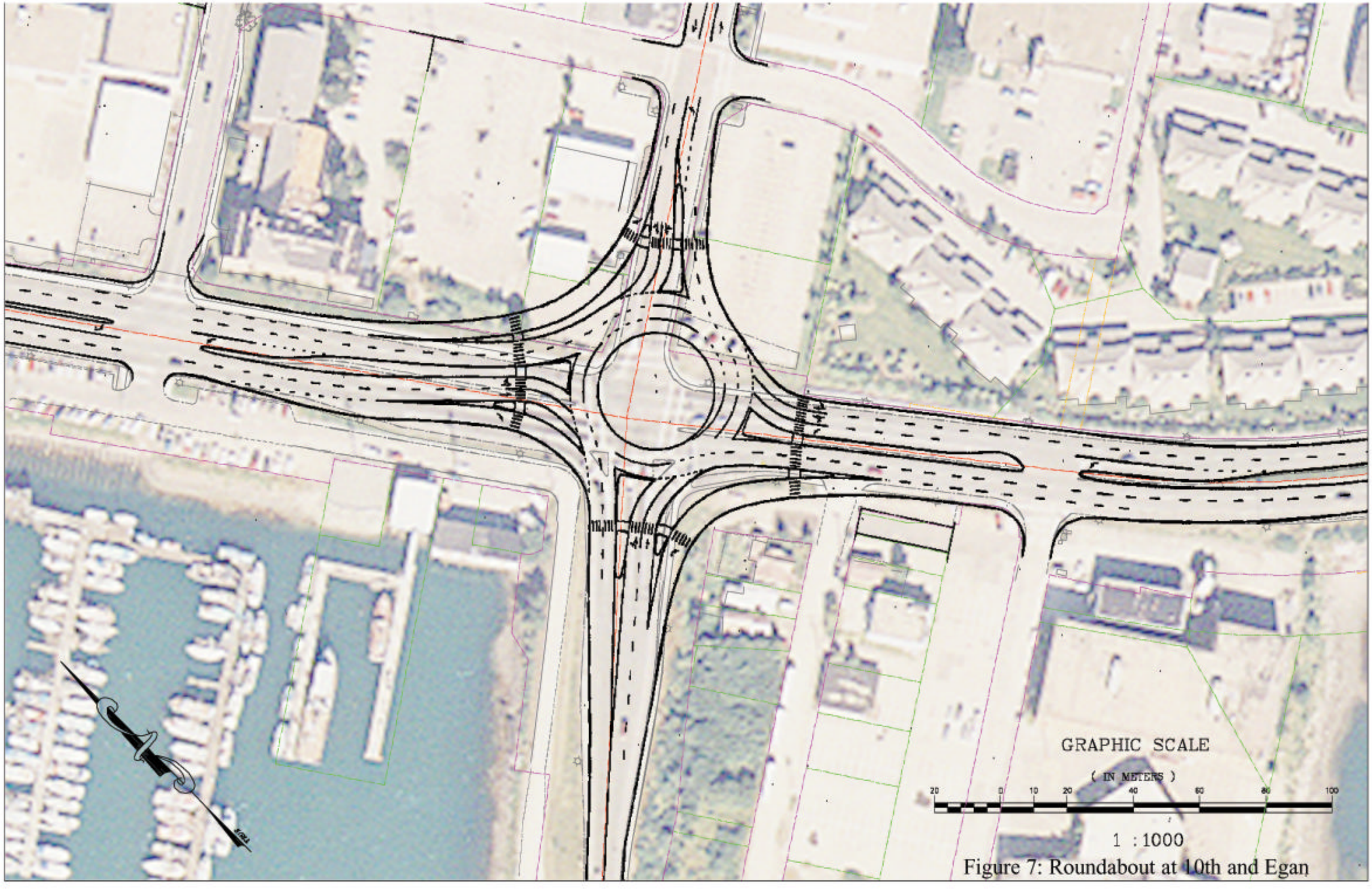
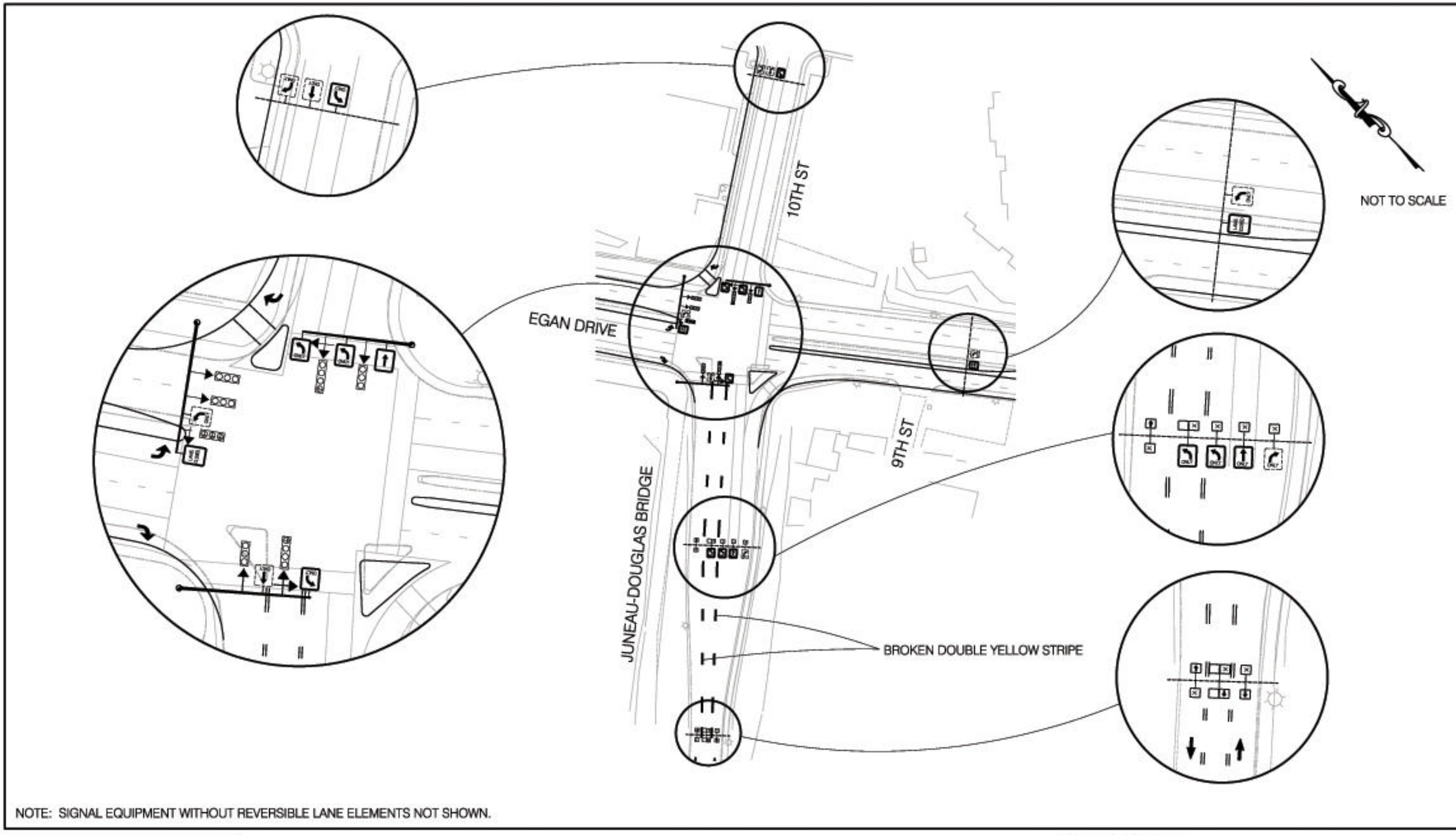


Figure 7: Roundabout at 10th and Egan



NOTE: SIGNAL EQUIPMENT WITHOUT REVERSIBLE LANE ELEMENTS NOT SHOWN.

LEGEND
- FIXED SIGN
- CHANGABLE SIGN
- REVERSIBLE LANE SIGNAL

SCENARIO IC:
WIDENING INTERSECTION
WITH REVERSIBLE LANE - AM

10TH/EGAN INTERSECTION IMPROVEMENTS JUNEAU, ALASKA	FIGURE 8
SEPTEMBER 2001	

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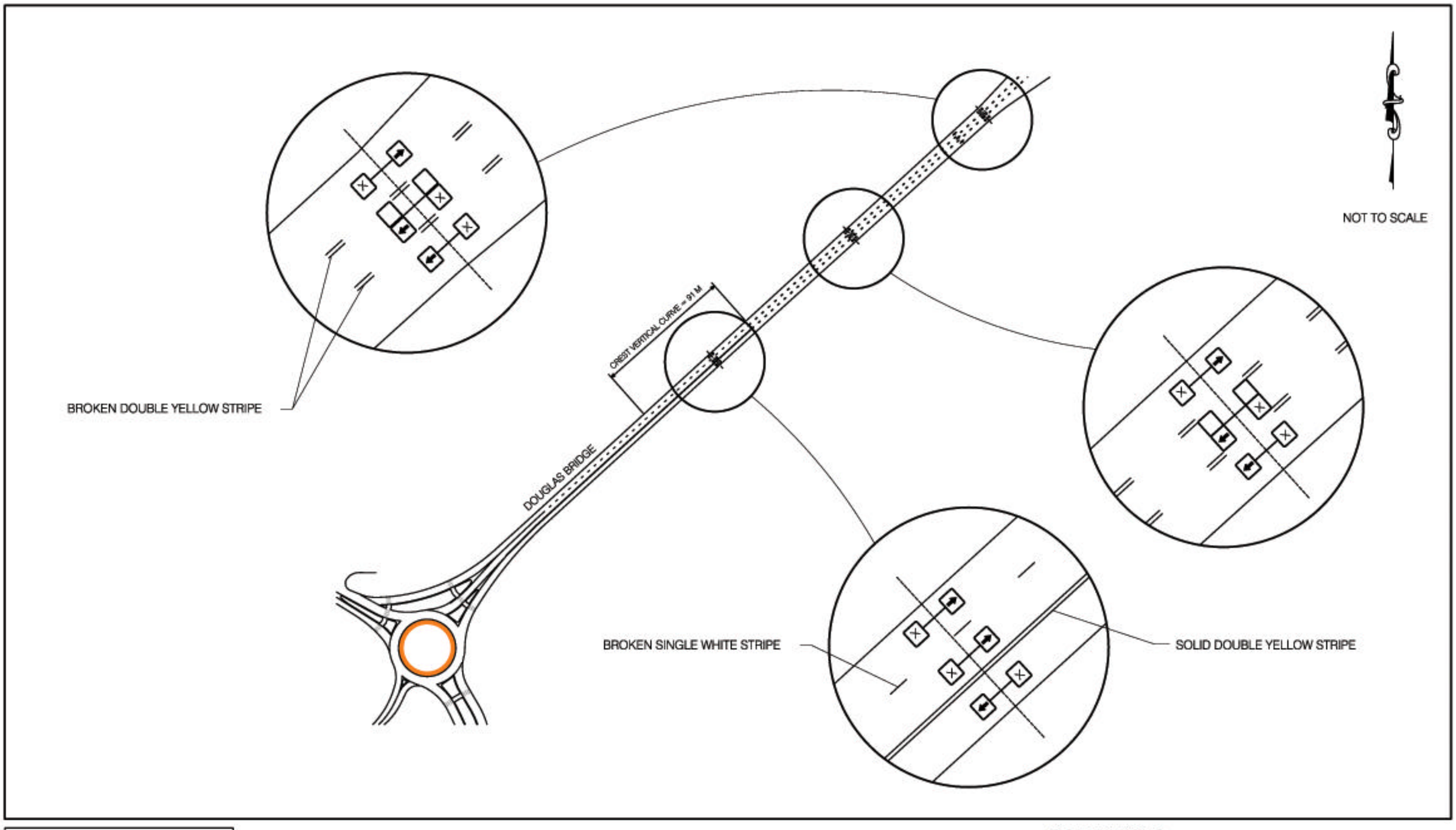
Figure 8: Reversible lane signage at 10th and Egan intersection - AM



LEGEND

☐ - REVERSIBLE LANE SIGNAL

SCENARIO IC:
DOUGLAS BRIDGE
REVERSIBLE LANE - AM

10TH/EGAN INTERSECTION IMPROVEMENTS JUNEAU, ALASKA	FIGURE 9
SEPTEMBER 2001	

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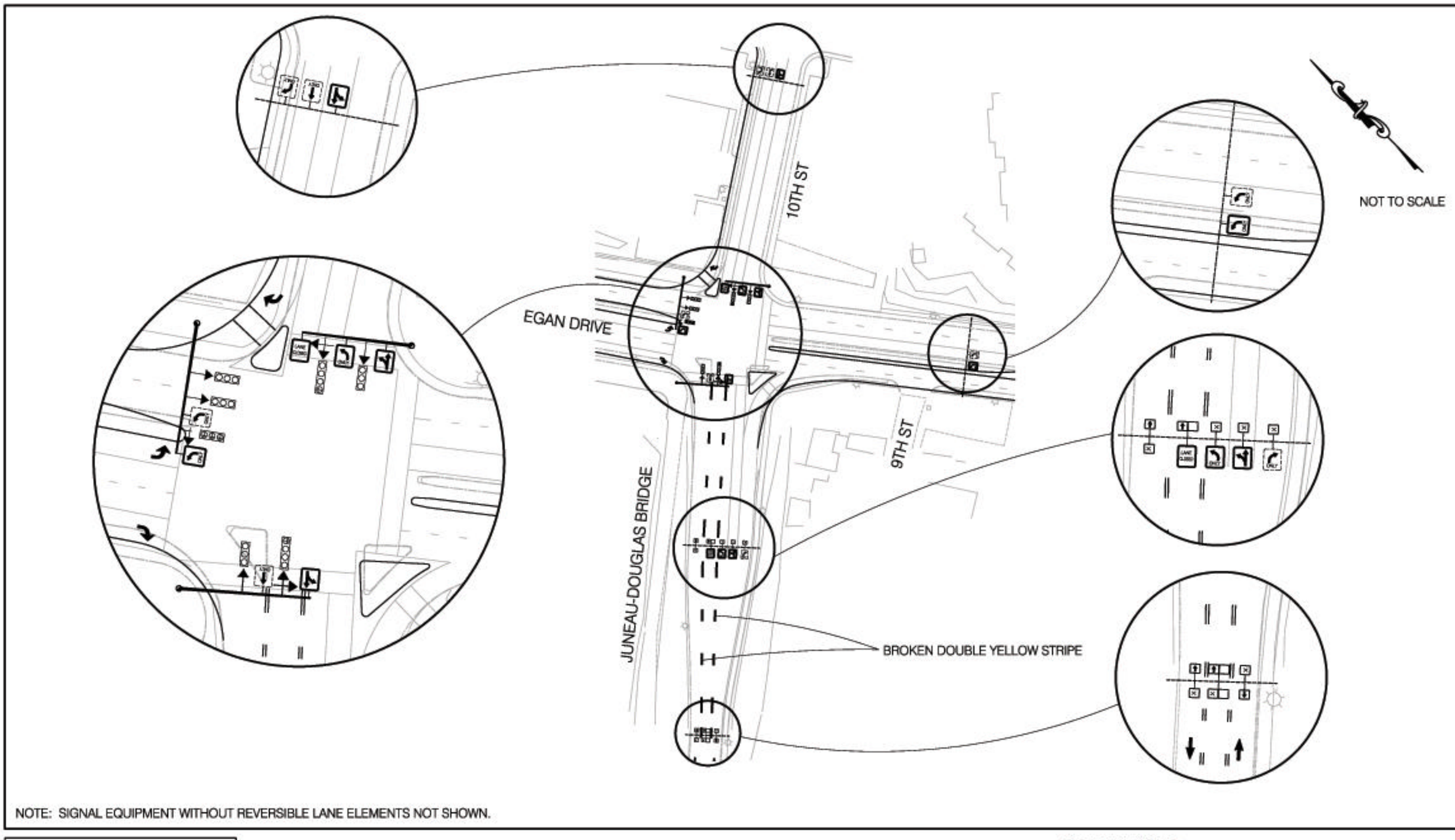
Figure 9: Reversible lane signage on Douglas Bridge - AM



NOTE: SIGNAL EQUIPMENT WITHOUT REVERSIBLE LANE ELEMENTS NOT SHOWN.

LEGEND
- FIXED SIGN
- CHANGABLE SIGN
- REVERSIBLE LANE SIGNAL

SCENARIO IC:
WIDENING INTERSECTION
WITH REVERSIBLE LANE - PM

10TH/EGAN INTERSECTION IMPROVEMENTS JUNEAU, ALASKA	FIGURE 10
SEPTEMBER 2001	

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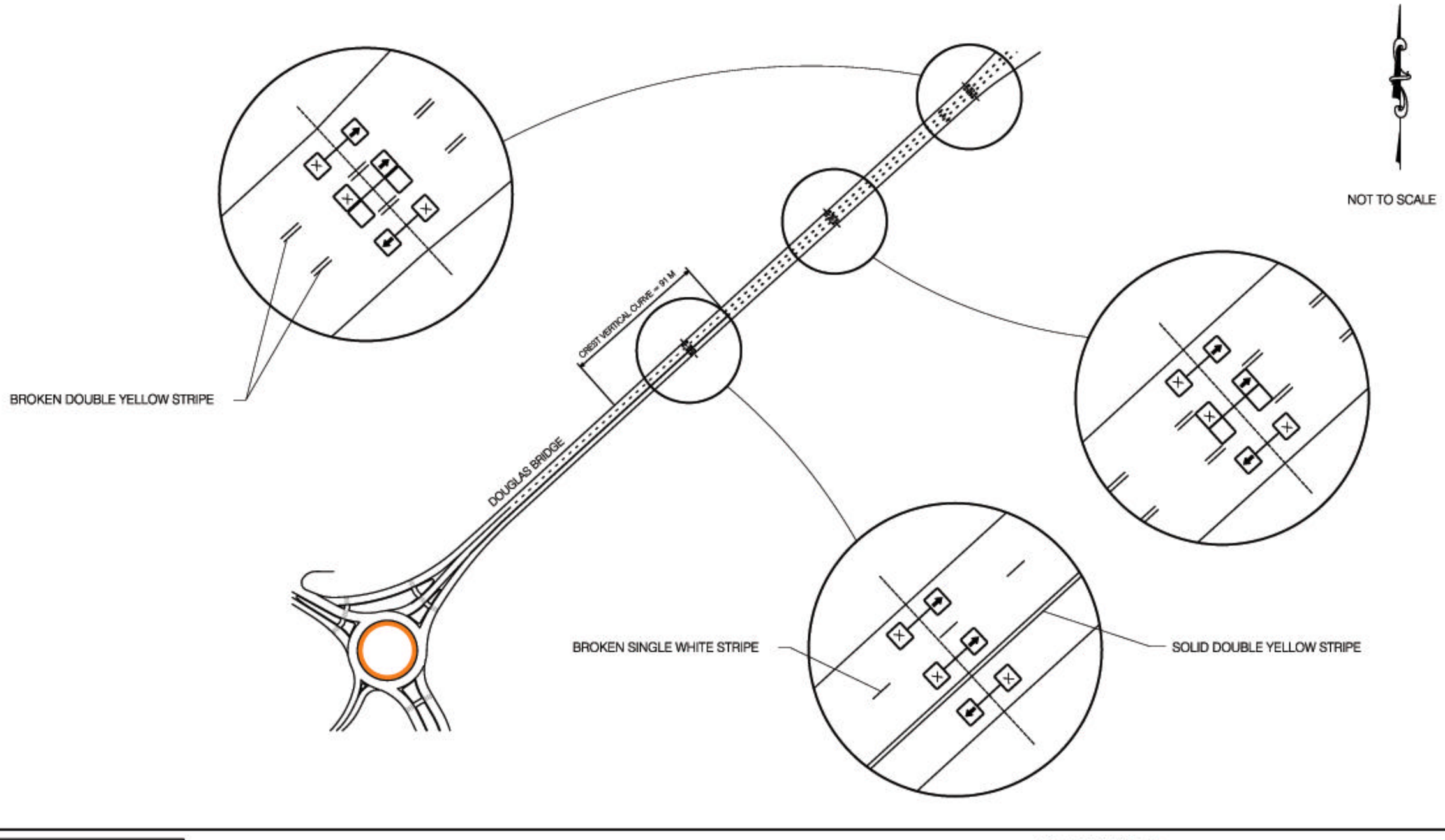
Figure 10: Reversible lane signage at 10th and Egan intersection - PM



LEGEND

□ - REVERSIBLE LANE SIGNAL

SCENARIO IC:
DOUGLAS BRIDGE
REVERSIBLE LANE - PM

10TH/EGAN INTERSECTION IMPROVEMENTS JUNEAU, ALASKA SEPTEMBER 2001	FIGURE 11

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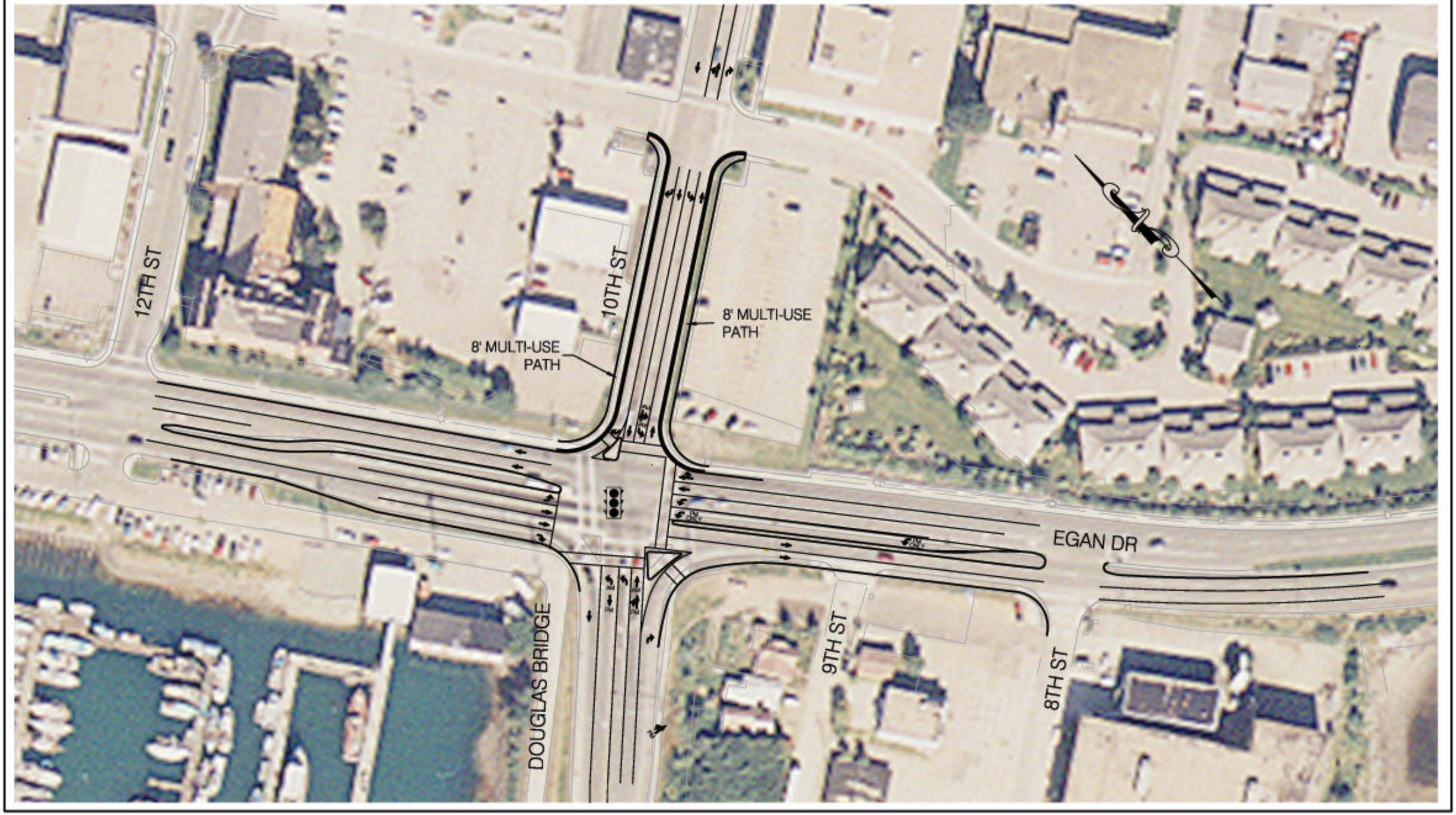
Figure 11: Reversible lane signage on Douglas Bridge - PM



LEGEND

- TRAFFIC SIGNAL

SCENARIO IC:
WIDENING INTERSECTION
WITH REVERSIBLE LANE - AM/PM

10TH/EGAN INTERSECTION IMPROVEMENTS JUNEAU, ALASKA	FIGURE *12*
DECEMBER 2002	

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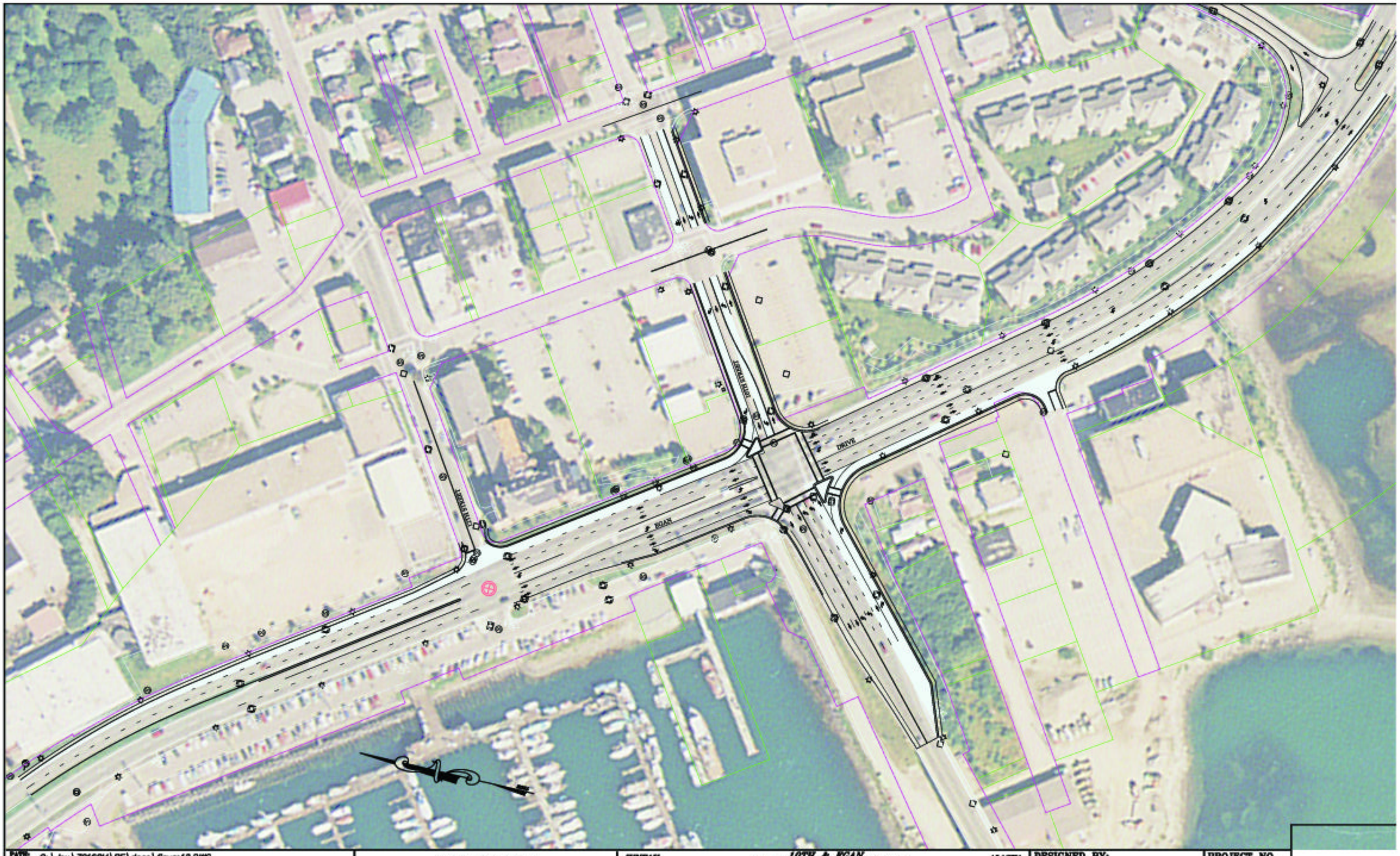


PATH: Q:\jnu\70168M\RE\docs\figure12.DWG	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHEAST REGION DESIGN & CONSTRUCTION	JUNEAU — 10TH & EGAN — ALASKA FED. NO. ~ PROJECT NO. 68156 **Figure 13** **Add auxiliary lanes to existing intersection**
PLOT:		
BY: / DATE: / DESCRIPTION OF CHANGE:		
RECORD OF REVISIONS		

DESIGNED BY: C. HAKARI	PROJECT NO. 70168M
DRAWN BY: C. HAKARI	DATE: 2002
CHECKED BY: P. CARROLL	SHEET X OF X

5.2 Douglas / North Douglas Alternatives

5.2.1 No build alternative

The no-build alternative for the Douglas Highway/ North Douglas Highway intersection consists of maintaining the roadways and the current configuration of the intersection.

5.2.2 Roundabout at Douglas Highway/ North Douglas Highway (Preferred Alternative)

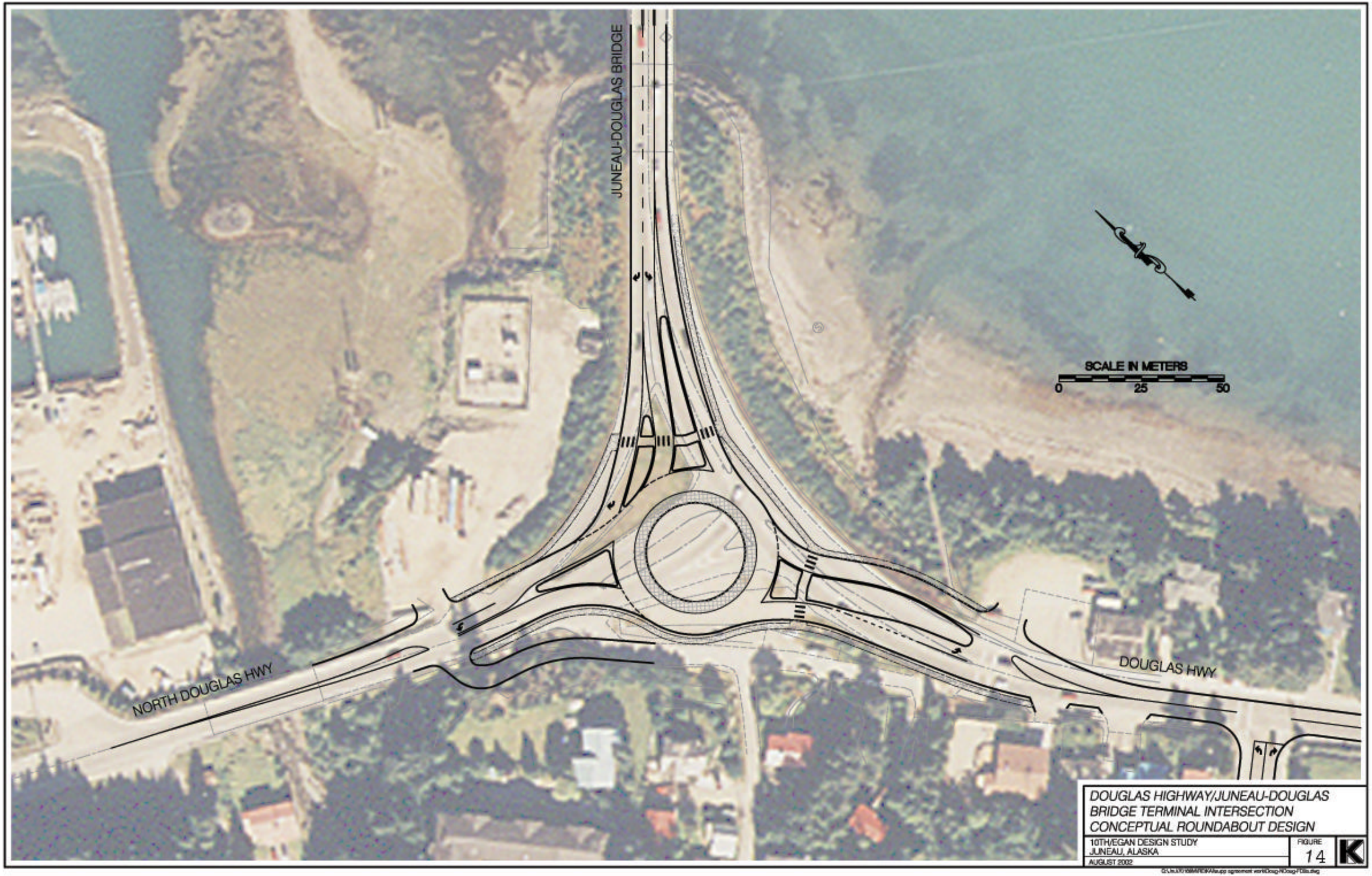
A 165 foot inscribed diameter single lane roundabout would be constructed at the Douglas Highway/ North Douglas Highway intersection. A right turn bypass lane would be included to accommodate traffic turning right from the bridge to North Douglas Highway. Sitka Street would be extended approximately 130' to the west and reconnected to the North Douglas Highway. Figure 14 illustrates this alternative.

5.2.3 Signalize Intersection with Existing Configuration

This alternative would add traffic signal control to the intersection retaining the existing configuration of the intersection. This alternative was not developed to the level of detail of the roundabout alternative. Traffic capacity analysis was used to compare this alternative to the other Douglas Highway/ North Douglas Highway alternatives. A graphic has not been generated to illustrate this alternative.

5.2.4 Reconfigure and Signalize Intersection

The intersection would be reconfigured into a tee intersection with the bridge approach leg teeing into Douglas Highway/ North Douglas Highway. A traffic signal would be installed to control the reconfigured intersection. This alternative was not developed to the level of the roundabout alternative. Traffic capacity analysis was used to compare this alternative to the other Douglas Highway/ North Douglas Highway alternative. A graphic has not been generated to illustrate this alternative.



DOUGLAS HIGHWAY/JUNEAU-DOUGLAS BRIDGE TERMINAL INTERSECTION CONCEPTUAL ROUNDABOUT DESIGN

10TH/EGAN DESIGN STUDY
JUNEAU, ALASKA

AUGUST 2002

FIGURE 14

6.0 ALTERNATIVE ANALYSIS

6.1 10th and Egan Alternatives

6.1.1 No Build Alternative

The no build alternative would retain the current configuration of the 10th and Egan intersection. Traffic would continue to grow and the intersection's functionality would continue to degrade. In design year 2022, the intersection would be over capacity. During the peak hours more cars would arrive at the intersection than could make it through, resulting in significant delays and queuing at the intersection. In the AM, heavy traffic flows on the inbound Egan Drive and Douglas Bridge approach legs would result in extensive vehicle queuing. In the PM, queuing would occur on the outbound Egan Drive and 10th Street approaches. Adjacent intersections would be negatively affected by vehicle queues backed up from the 10th and Egan intersection. Intersection levels of service for the 10th and Egan intersection, as well as the surrounding intersections, are already very poor and would worsen with increased traffic. Most intersections within the study area would have failing levels of service with the no build alternative. Section 3 of the 2001 10th and Egan Traffic Study details future conditions under the no build scenario; the reader is directed to that document for detailed information on future traffic volumes and intersection levels of service for this alternative.

Although no infrastructure improvements would be made under this alternative, the local community and government could consider implementing additional Travel Demand Management (TDM) measures to try to reduce or even reverse the traffic growth expected to occur over the next twenty years. TDM's primary purpose is to reduce the number of vehicles using the road system and it does so with measures such as:

- Flexible work hours
- Car-pool or van-pool incentives
- Park and ride facilities
- Changes to discourage use of short-term parking by those who park all-day
- Land use policies supporting more concentrated development in transit service areas
- Transit subsidies for employees
- Higher frequency transit service
- Transit system enhancements (e.g. bus shelters, lighting at bus stops, service hours consistent with activity schedules, etc.)
- Shuttle service connecting localized areas of high activity
- Constructing, lighting and maintaining a variety of pedestrian and bicycle facilities.

Some of these measures are already being implemented in Juneau, for example, flexible work hours, higher frequency transit service and improved bicycle and pedestrian facilities; however, TDM tools alone will not fulfill the needs for this project. National experience has shown an effective TDM area-wide program reduces traffic by just four to eight percent (FHWA Publication DOT-T-94-11, January 1994). Although TDM in Juneau appears to be more

successful, there is no reasonable expectation that TDM alone would preclude the need for highway improvements.

6.1.2 Roundabout at 10th and Egan

Constructing a multilane roundabout at the 10th and Egan intersection would be a long term solution that solves current and design year traffic congestion, but the solution has significant ROW impacts, is potentially difficult for pedestrians and bicyclists, and is an unfamiliar intersection form for most users.

Appendix C contains additional analysis information on this alternative. This analysis was completed subsequent to the final publishing of the traffic study report.

The roundabout would solve congestion problems at the 10th and Egan intersection for existing and future traffic conditions. The proposed roundabout solution would function at an acceptable volume over capacity (V/C) ratio (see footnote [1], table 9) in design year 2022. Average vehicle delays would likely be moderate even during design year peak hour conditions. Beyond the design year, adding lanes to the roundabout or employing queue management techniques could increase the capacity of the roundabout. Table 9 lists the average delays and V/C ratios calculated for the roundabout under 2022 AM and PM peak hour conditions.

Table 9: Roundabout at 10th and Egan Capacity Analysis Summary

	Avg. Delay (sec)		Volume over Capacity (V/C) Ratio [1]	
Condition	AM	PM	AM	PM
2022, Weekday Peak Hour	12.3	16.4	0.69	0.85

[1]Volume over capacity (V/C) ratio is a measure of how full an intersection is. A ratio of 1.0 means the intersection is at capacity. Anything over 1.0 means more cars are arriving at the intersection than can get through, indicating a failing intersection. A V/C ratio of 0.85 is desirable.

In order for the roundabout to function adequately with design year traffic volumes, bypass lanes would be required in all but the northeast quadrant of the intersection (Egan outbound to 10th Street). The bypass lanes would not be required initially and could be constructed in later years as needed. The anticipated schedule for the construction of the bypass lanes is as follows:

- 2006 Northwest quadrant (10th Street to Egan Drive Outbound)
- 2012 Southeast quadrant (Bridge to Inbound Egan Drive)
- 2017 Southwest quadrant (Egan Drive Inbound to Bridge)

If this alternative were to be advanced, the right of way (ROW) for the right turn bypass lanes should be acquired now to allow for the lanes to be developed when traffic volumes increase to a level that warrants them.

ROW requirements for the construction of the multi lane roundabout would be substantial. The primary impacts would be to the Downtown Tesoro service station in the northwest quadrant of the intersection, and the parking lot for the Goldbelt Plaza building in the northeast quadrant.

Several variations of the roundabout alternative were investigated in an attempt to avoid the service station, but none were successful. While the buildings could be avoided, the approach closest to the 10th and Egan Intersection would have to be closed. Closure of the approach is expected to have serious impacts to traffic circulation on the property. These impacts would be critical to a business, such as a service station, which is heavily reliant on quick and easy access. Because the access impacts could not be avoided, it is anticipated that a complete buy out of the service station would be required.

The roundabout would also have a substantial impact on the parking lots for Goldbelt Plaza building. The main lot, which provides parking for 118 vehicles, is located across 10th street from the service station in the northeast quadrant of the intersection. A smaller, overflow parking lot (21 spaces) is located in the northwest quadrant of the intersection between Egan Drive and the Downtown Tesoro service station. A complete take of the overflow lot would be required, causing a loss of 21 parking spaces. In the main lot, approximately 25% of the total area of the lot would have to be acquired, equating to an estimated 30 parking spaces. With the buy out of the service station, it is anticipated that lost parking could be replaced from the portion of the service station lot outside the footprint of the roundabout. As mentioned above, several variations of the roundabout were considered while optimizing the roundabout design. Typically, the better the option was for the service station, the worse it was for the parking lot and vice versa.

A small ROW take would be needed from the south end of the University of Alaska, Bill Ray Center parking lot located in the northwest quadrant of the intersection. This take would be from a greenbelt area and no loss of parking spaces is anticipated. Minor takes would also be necessary from the lot in the southeast quadrant of the intersection. In this area, the footprint of the roundabout itself is within the existing ROW, but pedestrian facilities and/or fill slopes would likely necessitate additional ROW.

Construction of the roundabout would require closure of the Ninth Street approach to Egan Drive. This is a very low volume approach and ingress and egress to the area could be established via Eighth Street. Currently, there does not appear to be a ROW connecting Eighth Street and Ninth Street. Vehicles are able to make the connection, but it is done through the adjacent office building parking lots or the CBJ maintenance facility yard. If the Ninth Street approach is closed at Egan Drive, a new ROW would need to be established to connect Eighth and Ninth Streets and thereby maintain access to properties on Ninth Street.

Multi-lane roundabouts can be difficult for bicyclists and pedestrian to get across. Low speeds and multi-staged crossings are beneficial to non-motorized users (crossing can be split up with users crossing from edge of lanes to splitter island, then completing the crossing from the splitter island to the opposite side of roundabout). However, the constant flow of traffic through the roundabout produces few gaps in which to make a safe crossing. Exit lanes can be especially difficult as drivers are focused on making their exit and accelerating out of the roundabout, and

are not expecting to encounter a cyclist or pedestrian in a crosswalk. These difficulties combined with the unfamiliarity of this type of intersection for all users raises safety concerns for the non-motorized users of the facility.

A roundabout at the 10th and Egan intersection would be the first true roundabout intersection to be constructed in Juneau. This type of intersection would be unfamiliar to the majority of its users. Single-lane roundabouts have been implemented successfully in numerous locations across the US; however, the use of double-lane roundabouts has been less common and triple lane roundabouts are relatively rare in the US. Multi-lane roundabouts are more complex than their single lane counterparts. Drivers are required to make additional decisions when using the multi-lane roundabout, such as choosing the proper lane for entering, positioning themselves laterally while circulating, and choosing the correct lane for exiting. The logical progression for implementing a roundabout into a community would be to start with the simplest single lane version and allow users to get used to it in that form. Later, the multi-lane version could be considered, as the users will already have a basic knowledge of how the intersection functions. The decision to construct a multi-lane roundabout as the first one in the community is one that must be carefully considered and a significant public education process would have to be deployed prior to opening the facility.

6.1.3 Widen Existing Intersection with Reversible Lane on Bridge (Preferred Alternative)
This alternative would provide a long term solution that solves current and future AM and PM capacity problems at 10th and Egan but it reduces the space available on the bridge for roadway shoulders and bicycle lanes and requires a complex and uncommon signal system.

The reversible lane option provides acceptable AM and PM traffic performance with predicted design year (2022) traffic. Table 10 lists the results of the traffic performance analysis for study area intersections under 2022 traffic conditions. It should be noted that under the future year design traffic volumes, traffic signals would likely be required at the intersections of Glacier Spur / Egan, Willoughby / Glacier Spur / Glacier Ave., 10th / Glacier Ave., and 12th / Glacier. The future year analysis was done assuming signals would be installed at these locations. For current year traffic volumes the additional signals would not be required and therefore would not be constructed as part of the current project. The additional signals may be added if needed in future years under separate projects.

Table 10: Reversible Lane alternative 2022 Traffic Conditions

Intersection	Level of Service		Volume over Capacity (V/C) Ratio	
	AM	PM	AM	PM
10th / Egan *	D	D	0.92	0.90
9th / Egan	B	A	0.01	0.01
8th / Egan	F	B	0.50	0.06
Glacier Spur / Egan *	B	B	0.47	0.80
Willoughby / Glacier Spur / Glacier Ave. *	B	B	0.41	0.79
10th / Glacier Ave. *	C	D	0.57	0.90
12th / Glacier Ave *	C	B	0.88	0.46
12th / Egan	F	F	0.95	>1.0

* *Analyzed as a signalized intersection*

The Douglas Bridge would be changed from 2 lanes to 3 lanes with this alternative. Several alternatives for widening the bridge were investigated by the ADOT & PF bridge design section. Structural engineers evaluated various options for bridge deck widening and considered relocating the pedestrian walkway beneath the bridge to allow vehicular traffic to use the entire 44-foot width of the bridge. The final recommendation of the bridge design section was to not widen the deck of the bridge. The bridge design section also determined that the relocation of the pedestrian sidewalk to underneath the bridge was not feasible; therefore, all modifications had to fit within the existing width.

The current width available between the roadway railings of the bridge is 36 feet, which consists of two 12-foot travel lanes and two 6-foot shoulders / bicycle lanes. In addition to the travel lanes and shoulders, the existing bridge has a 6-foot sidewalk on the east side (downtown Juneau side) of the bridge. A railing separates the sidewalk from the vehicular use portion of the bridge.

The original design considered was to retain all of the bridge railings in their existing locations. This section would consist of a 10- foot center lane with 13-foot outside lanes, and retention of the existing 6-foot sidewalk. This section was laid out at the July 27, 2002 public meeting. The design drew substantial criticism from both bicyclists and pedestrians. Cyclists were concerned that the 3' shoulders would not be adequate for them to ride in and that cyclists would be forced

to use the sidewalk to cross the bridge or ride with traffic in the center of the travel lanes. Pedestrians and cyclists alike were concerned that the 6' sidewalk was not wide enough to accommodate both cyclists and pedestrians. As a result of the comments received at this meeting alternative configurations were considered for the bridge. A number of configurations were considered and discarded. They are as follows: (sections are listed from left to right as they would appear if looking over the bridge towards Douglas. All dimensions given reflect the width of the stated portion.)

- New outside railing, 5' non-raised sidewalk, 6" curbed island, 3.5' shoulder, 3 -10' traffic lanes, 4' shoulder, existing outside railing.
- New outside railing, 7.5' multi-use pathway, 2' curbed island w/ chain link fence located 6" in from face of curb nearest the pathway, 11' outside traffic lane, 10' center traffic lane, 12.5' outside traffic lane, existing outside railing.
- New outside railing, 6' shoulder 10' outside traffic lane, 11' center traffic lane, 10' outside traffic lane, 6' shoulder, existing outside railing.
- New outside railing, 7.5' shoulder/non-raised sidewalk (3' sidewalk, 2' striped separation, 2.5' shoulder), 10' outside traffic lane, 10.5' center traffic lane, 10' outside traffic lane, 5' shoulder, existing outside railing.
- New outside railing, 5' raised sidewalk, 3.5' shoulder, 3 -10' traffic lanes, 4.5' shoulder, existing outside railing.
- New outside railing, 8' raised multi-use path, chain link fence, 1.5' raised shoulder, 11' outside traffic lane, 10' center traffic lane, 12.5' outside traffic lane, existing outside railing.
- New outside railing, 5' raised sidewalk, 3.5' shoulder, 14' outside traffic lane, 10' center traffic lane, 15' outside traffic lane, existing outside railing.

The primary shortcoming of all the above mentioned configurations is the necessity of a new outside railing. All of the above options would eliminate the intermediate railing on the bridge that separates the sidewalk from the traffic lanes. This would make it necessary to replace the existing outside pedestrian railing with a much stronger rail system that could withstand the impact of an errant vehicle. The following concerns regarding the rail replacement were raised by bridge design:

- Retrofitting a new side mounted rail system to the bridge would be difficult given the abundance of reinforcing bars and post tensioning strands present in the bridge.
- A new side mounted rail system would require crash testing to ensure it meets current design standards. This is a costly and lengthy process. It is estimated that the soonest that this could be completed would be 6-9 months.
- A new deck mounted rail system is possible but would consume an additional 2' of the available width of the bridge. The loss of 2' of useable width would make these solutions unfeasible.

The section eventually selected consists of a 7.5-foot multi-use pathway separated from the travel lanes by a concrete barrier, a 11.5-foot Juneau bound outside lane, a 10-foot reversible center lane, and a 12-foot Douglas bound outside lane. The concrete barrier would replace the existing intermediate railing. This type of barrier can be easily installed on the bridge and meets

crash tested standards. The additional width in the outside traffic lanes is to provide some shy distance from the bridge railings for vehicles. The proposed typical section is shown in Figure 15.

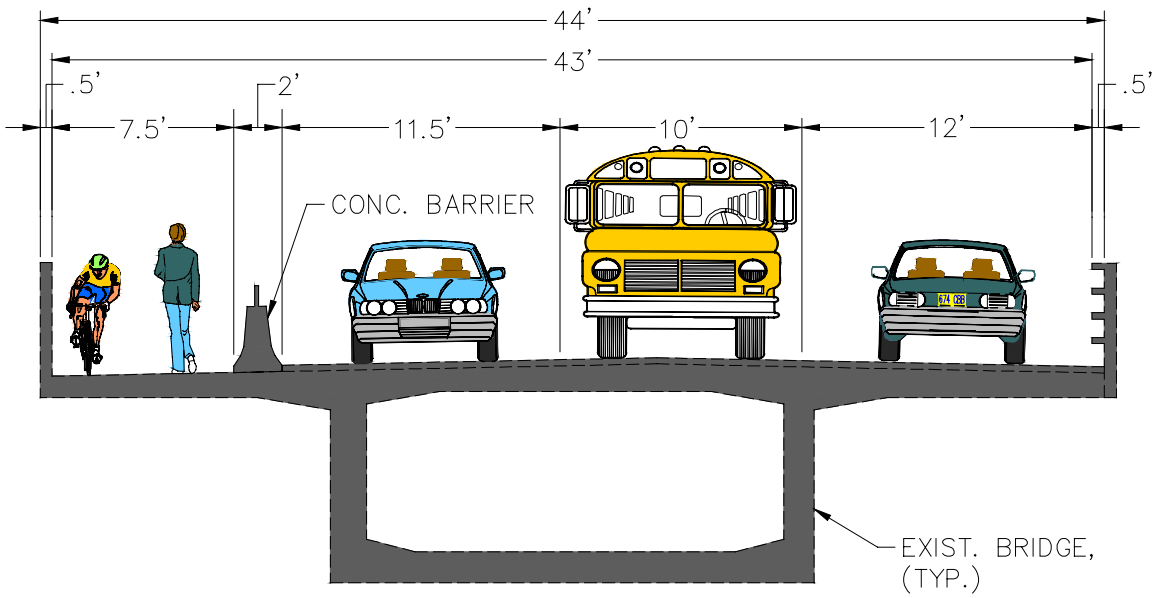


Figure 15: Proposed Typical Section for Reversible Lane Bridge

The open railings on the outside of the Douglas bound driving lane and on the outside of the multi-use pathway may cause the users to feel uncomfortable as they can see water when walking, driving or cycling close to the railing. To provide additional visual screening the final design should consider placing a tight mesh chain link fence on the railings.

The existing 6' sidewalk would be widened to 7.5' to better accommodate the mixed use of pedestrian and bicyclists. The new concrete barrier would be fitted with a metal railing to bring its total height up to 42". The 42" height is required to meet current standards for railing adjacent to a bicycle facility.

Due to the loss of the shoulders / bicycle lanes with this alternative, bicycle traffic would primarily use the 7.5' multi-use path. It is anticipated that stronger, more avid, commuter cyclists would opt to ride with traffic, and they would not be precluded from doing so. To investigate current bicycle and pedestrian usage on the bridge, a bicycle and pedestrian count was done from 7AM to 7PM on May 18, 2001. That day was Bike-to-Work day; therefore it probably represents a peak bicycle use day, at least so far as commute periods are concerned. The weather was overcast with occasional light showers. During the 12-hour count period, 57 cyclists crossed the bridge. Of the 57 cyclists, 31 used the bicycle lanes and 26 used the sidewalk, revealing that even with the bicycle lanes available a large percentage of the cyclists currently opt to cross the bridge on the sidewalk (a detailed breakdown of the count data is included in Appendix D). Given that nearly half of the bicyclists currently opt to ride on the existing sidewalk and

narrowing the bike lanes would likely drive more cyclists to the sidewalk, it is reasonable to try to improve that facility and legitimize its de facto use as a multi-use pathway. Although less convenient for commuter cyclists this change would be an improvement to many of the cyclists crossing the bridge, as well as pedestrians.

The construction of a center reversible lane on the north end of the Douglas Bridge necessitates complex signage and changeable sign control systems at the 10th and Egan intersection. The signing required both at the intersection and over the bridge is shown in Figures 8-11, located in section 5 of this report. In addition to standard red X and green arrow signs to control the flow of traffic in the reversible lane, changeable lane use control signs are also required to control the use of turning lanes at the 10th and Egan intersection. Figure 16 illustrates the turning movement variations between the AM and PM configurations. The changeable message signs would require a fairly complicated system to control its operation, but the system is feasible using today's fiber optic and/or light emitting diode (LED) technology. Drop down barrier gates were considered to close the second left turn lane from Egan Drive outbound to the bridge during AM operations, but it was decided that the changeable message sign with a "lane closed" legend would be adequate to control the lanes use. If the operation proves problematic in the future, gates could be added to the system at that time. The drop down gates would add maintenance costs and would complicate snow removal operations at the intersection. Consideration should be given during the design to select system controls that could be used to control the gates operation should they be required in the future. In addition, the median between the inbound Egan Drive lanes and the left turn lane should be of sufficient width to allow the installation of the gates.

The center lane of the bridge would be reversible from the crest of the vertical curve on the bridge toward the north (Juneau). The extra lane is required to allow additional space for vehicles to queue at the 10th and Egan intersection in the morning. In the evening the center lane provides an extra lane to receive vehicles turning left from outbound Egan Drive or coming straight through from 10th Street, allowing a double left turn lane and through lane respectively. The center lane is not required to provide additional lane capacity over the Douglas Bridge but to facilitate getting additional traffic volume through the 10th and Egan signal. As such, it is not necessary to carry the reversible lane through the crest vertical curve on the bridge. This allows the entire reversible lane to be visible to drivers using the lane. If the lane was extended through the vertical curve, sight distance would be impaired by the curve and the risk of improper lane use causing a head-on collision would be increased. On the south (Douglas) side of the vertical curve, the lane configuration would consist of one lane headed toward Juneau and two lanes toward Douglas. For the lanes heading toward Douglas, the outside lane would lead into the bypass lane and serve traffic heading to North Douglas, while the center lane would lead into the roundabout and would serve vehicles going to Douglas. In this area, a single lane is available to vehicles exiting the roundabout heading over the bridge toward Juneau; however, in the AM, once over the crest curve, the center lane provides additional storage capacity for traffic queued at the10th and Egan intersection.

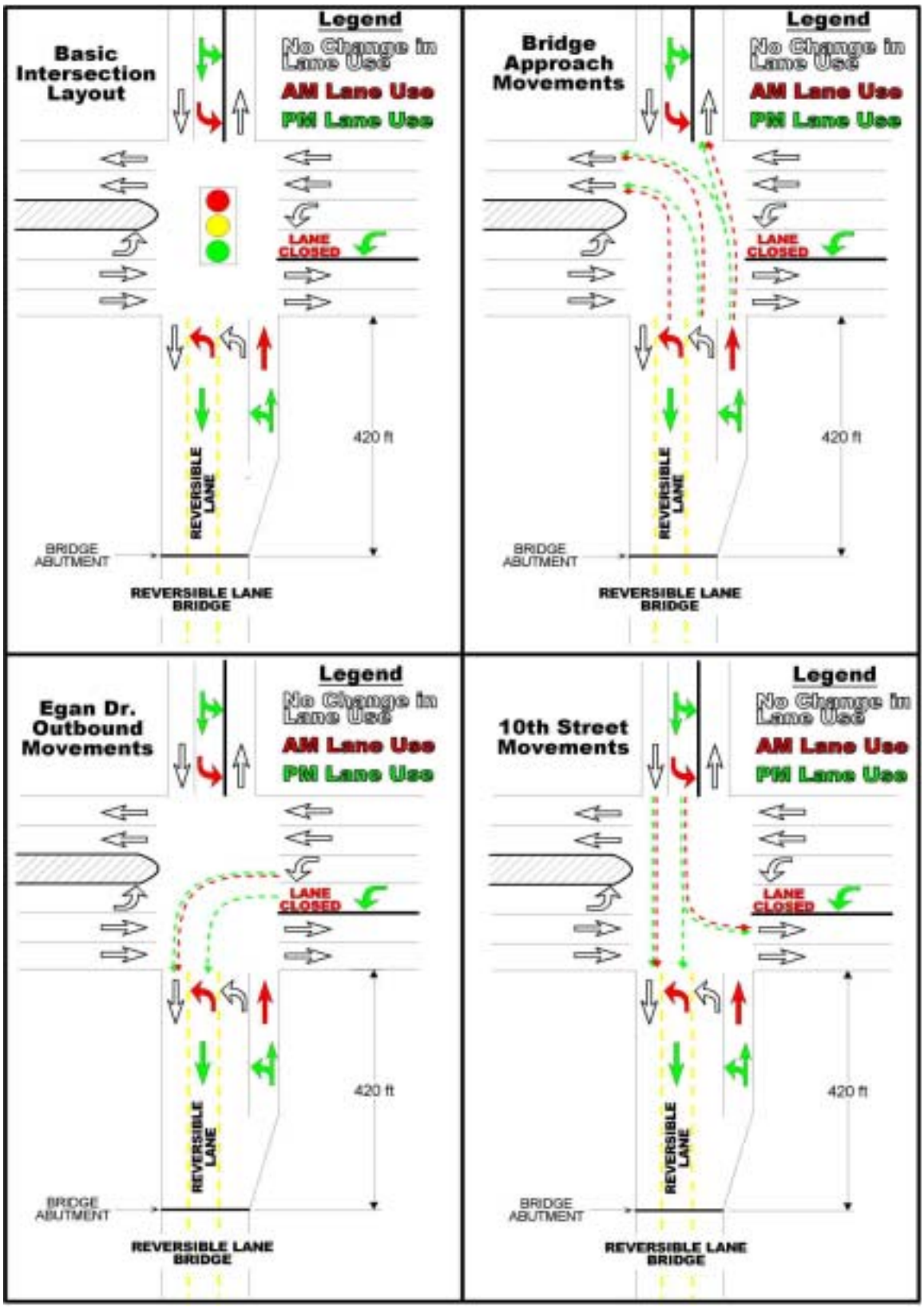


Figure 16: Turning Movements at 10th and Egan intersection with Reversible Lane Alternative

The operations at the 10th and Egan intersection may be confusing to some drivers. Drivers may be confused by a turn lane that is open in the evening, but closed in the morning, or by a turn lane that flows into the outside lane of Egan Drive in the morning, but flows into the inside lane in the evening. One mitigating circumstance to this, however, is that most drivers using the intersection will be repeat users and will be familiar with the its operation. The overhead lane use control signs would be the only control available to guide the driver. Painted pavement markings that are typically used in conjunction with overhead signs would not be possible due to the changeable nature of the lanes usage, but recessed in-pavement lighting may be possible to provide route delineation.

6.1.4 Add Auxiliary Lanes to Existing Intersection

This alternative was developed after completion of the traffic study. This alternative is a simple solution with minimal impacts that could solve at least some of the traffic problems at the 10th and Egan intersection. This alternative would improve the AM traffic problems, but would do little to remedy PM traffic congestion.

Analysis of this alternative reveals that it could maintain an acceptable LOS in the morning peak period through approximately 2015; however, beyond that year the LOS in the AM is expected to be unacceptable and additional improvements would be required. The 2022 AM V/C ratio would be 0.97, indicating that the intersection would be functioning at 97% of its capacity and that little reserve capacity would be available. This is another indication that additional improvements would be required. A shortcoming of this alternative is that it does little to improve the conditions during the PM peak period in future years. The alternative is expected to slightly improve the PM conditions under existing traffic volumes, raising the intersection LOS from E to D, but the LOS would return to level E by 2005 and further degrade to F by 2010. The V/C ratio for the existing year is 1.0 indicating that the intersection is functioning right at its capacity. The 2022 V/C ratio of 1.29 indicates an over capacity situation at the intersection and verifies the shortcomings of this alternative in the future PM peak time. The traffic analysis results for this alternative are summarized in Table 11.

Table 11: Add Auxiliary Lanes Alternative Analysis Summary

Year	Intersection Level of Service		Volume over Capacity (V/C) Ratio	
	AM	PM	AM	PM
Existing	D	E	0.74	1.00
2015	D	-	0.86	-
2022	F	F	0.97	1.29

This alternative would require ROW takes from a portion of the Harborview School playground for a new westbound Egan Drive acceleration lane. The playground is potentially under the jurisdiction of the U.S. Department of Transportation Act Section 4(f). Any action that includes a taking of property from or otherwise impacts a 4(f) resource must withstand rigorous and critical scrutiny beyond that normally required by the National Environmental Policy Act (NEPA). A determination of whether or not the playground property qualifies under section 4(f) would be required if this alternative was advanced. It may be possible to construct the

acceleration lane and avoid the playground property but undesirable compromises to lane widths and geometry of Egan Drive would be necessary.

The Ninth Street approach to Egan Drive would require closure under this alternative. As discussed under section *5.1.2 Roundabout at 10th and Egan*, this closure would necessitate a new ROW be established to connect Eighth and Ninth Streets.

6.2 Douglas / North Douglas Alternatives

6.2.1 No Build Alternative

The no build alternative would not make any changes to the Douglas / North Douglas intersection. Traffic would continue to grow and the intersection's functionality would continue to degrade. In the design year 2022 the intersection would be over capacity, resulting in significant delays and long queues at the intersection. See section 3 of the 2001 10th and Egan Traffic Study for details of future conditions under the no build scenario.

6.2.2 Roundabout at Douglas / North Douglas (Preferred Alternative)

Construction of a single lane roundabout at the Douglas / North Douglas intersection would provide an acceptable level of service and queuing through approximately 2015. The roundabout would have to be converted to a double lane roundabout to acceptably handle traffic volumes beyond 2015 if traffic continues to grow at historical rates (analysis shows future year (2022) queues building to over 700 feet in the morning peak period with the single lane roundabout). A summary of the traffic analysis results can be found in Table 12.

Table 12: Roundabout at Douglas / N. Douglas Capacity Analysis Summary

	Avg. Delay (sec)		Volume over Capacity (V/C) Ratio		Queue Length (feet)	
Description - Year	AM	PM	AM	PM	AM *	PM #
Single Lane - Existing	12.5	11.7	0.59	0.51	215	214
Single Lane - 2022	17.7	-	0.89	-	761	-
Double Lane - 2022	12.9	11.7	0.44	0.36	146	114

* northbound lane queue # southbound lane queue

There is a large existing ROW available at the Douglas Highway/ North Douglas Highway intersection. The large area is well suited for the construction of the roundabout and no additional ROW needs are anticipated. The initial single lane roundabout would be constructed with an inscribed diameter of 165 feet, which is sufficient for double lane roundabout. As such, no additional ROW would be needed when the conversion is made. The conversion to a double lane roundabout would eliminate the need for the bypass lane for right turning traffic from the bridge to North Douglas Highway. The area occupied by the bypass lane would be converted to a two-lane entry into the roundabout.

Public acceptance is often one of the biggest challenges facing a community's first roundabout. Without the benefit of explanation or first-hand experience and observation, the public is likely to incorrectly associate roundabouts with older, nonconforming traffic circles that they have

experienced, heard about, or seen in movies (usually portrayed in an unflattering manner). Equally likely, without adequate education, drivers often have a natural hesitation or resistance against changes in their driving behavior and driving environment. As such, driver education would be necessary if this alternative is pursued. A public involvement process that includes public meetings, informational brochures and videos, and media announcements is recommended. Even with an aggressive education program, accidents may occur immediately after construction as drivers adjust to the new intersection, but the accidents are seldom severe.

The single lane roundabout is fortunately the simplest form of roundabout and is the easiest for the public to learn to use correctly and has an excellent record of public acceptance in its modern form. With its lower speed traffic and shorter crossing lengths the single lane roundabout is generally safer and easier to cross for bicyclists and pedestrians than multi-lane versions.

Crosswalks would be provided at Douglas Highway and Douglas Bridge approaches to the roundabout; there would not be a crosswalk provided on the North Douglas Highway approach. A new 8’ multi-use pathway would be constructed along the east side of the Douglas Highway bridge approach to connect the proposed bridge pathway to the existing facilities on Douglas Highway. The new crosswalks would tie into the new pathway.

6.2.3 Signalize Intersection with Existing Configuration

This alternative functions well under existing traffic demands but under 2022 traffic the intersection would be near its capacity and long traffic queues would be present during both AM and PM peak hours. A summary of the traffic analysis results can be found in Table 13.

Table 13: Signalize Intersection with Existing Configuration Capacity Analysis Summary

	Intersection Level of Service		Volume over Capacity (V/C) Ratio		Queue Length (feet)	
Year	AM	PM	AM	PM	AM *	PM #
Existing	B	A	0.71	0.66	260	303
2022	C	B	0.92	0.88	515	678

* northbound lane queue # southbound lane queue

6.2.4 Reconfigure and Signalize Intersection

This alternative explored the possibility of reconfiguring the Douglas / North Douglas intersection by making the Douglas / North Douglas Highway a straight through movement with the bridge approach teeing into it. When compared to adding a signal without reconfiguration this alternative had slightly better performance in the AM under existing traffic conditions, but significantly reduced performance in the PM. Future year performance was worse in both the AM and PM. PM future year V/C ratio would be over 1.0 indicating that the intersection would be over capacity, an unacceptable condition that results in significant delays to vehicles using the intersection. The 1470-foot southbound lane queue length is a further indicator of the short-coming of this solution. A summary of the traffic analysis results can be found in Table 14.

Table 14: Reconfigure and Signalize Intersection Capacity Analysis Summary

Year	Intersection Level of Service		Volume over Capacity (V/C) Ratio		Queue Length (feet)	
	AM	PM	AM	PM	AM *	PM #
Existing	A	C	0.67	0.81	148	605
2022	C	E	0.93	1.08	591	1470

* northbound lane queue # southbound lane queue

7.0 DESCRIPTION OF PREFERRED ALTERNATIVE

The preferred alternative for this project is to widen the 10th and Egan intersection, add a reversible center lane on the bridge, and construct a single lane roundabout at the Douglas / North Douglas intersection. This alternative provides a long-term solution to the congestion problems at the intersections during both the AM and PM peak hours.

7.1 Horizontal and Vertical Alignment

7.1.1 Egan Drive

The alignment of the Egan Drive inbound lanes would be shifted toward the channel to allow construction of a second left turn lane from outbound Egan Drive to the Douglas Bridge. The alignment shift would begin just west of the 12th Street intersection and tie back into the existing alignment near the Glacier Spur intersection. Accommodating the alignment shift to the channel side of Egan Drive is recommended to prevent impacts to the Parkshore Condominiums on the inland side of Egan Drive.

No changes in the vertical alignment of Egan Drive would be required.

7.1.2 Douglas Highway/ North Douglas Highway

Reconfiguration of the Douglas Highway/ North Douglas Highway intersection into a roundabout would require realignment at the intersection approach legs leading into the roundabout. The realignments are required mostly in the close proximity of the roundabout to achieve the desired flare of the approach roadways into the roundabout. The Douglas Highway approach requires the greatest realignment. Sitka Street would be extended approximately 130' to the west and reconnected to the North Douglas Highway.

The roundabout would require regrading of the intersection area and the approaches into the intersection. The Federal Highways Administration Publication: "*Roundabouts: An Informational Guide*" (section 6.3.11.3) recommends 3 percent as the maximum grade through a roundabout. The desirable configuration is to construct the roundabout on a level plane. The existing intersection and approaches are at a 4% grade sloping upward toward the Douglas Bridge.

7.2 Bicycle and Pedestrian Facilities

Bicyclists and pedestrians would share a 7.5’ wide multi-use path on the east side of the bridge. This is permitted by both state law (13 AAC 02.400) and local ordinance (Chapter 72.02.400) and, according to the AASHTO Bicycle Guide (page 20), is allowed for certain limited circumstances such as “(t)o provide bikeway continuity along…heavily traveled roadways having inadequate space for bicyclists, and uninterrupted by driveways and intersections,”…and “(o)n long, narrow bridges.” AASHTO recommends a minimum clear width of 10’ for a multi-use path across a bridge structure. Although the 7.5’ width is sufficient for two-way traffic, consideration should be given to striping a centerline to facilitate passing or overtaking and placing signs that advise bicyclists to yield to pedestrians.

North of the bridge the multi-use path would continue to the 10th/Egan intersection where it would connect to an 8' wide multi-use path running along the south side of Egan Drive between 10th/Egan and downtown. Bicyclists and pedestrians may also use the crosswalks at 10th/Egan to access the harbors to the west or 10th Street to the north. The existing sidewalks on each side of 10th Street would be widened from 5' to 8' between Egan Drive and F Street for use by both bicyclists and pedestrians. North of F Street, pedestrians would travel along 10th Street via the existing sidewalks and bicyclists would ride in the existing wide curb lanes.

South of the bridge the multi-use path would continue to and around the perimeter of the new roundabout. Crosswalks would be placed at the Bridge and Douglas approaches but not on the North Douglas approach.

Some bicyclists will likely elect to ride in the travel lanes with motorized traffic on 10th Street, across the bridge, and in the roundabout. Motorists should be alerted to this by placing a "Share the Road" sign on the bridge in each direction.

7.3 Right of Way Requirements

The widening of Egan Drive to the East and West of the 10th and Egan intersection could largely be accomplished within existing ROW. The ROW width along the channel side of Egan Drive between the 8th and 9th Street approaches is constricted. To allow for widening and retention of the adjacent pedestrian facilities, additional ROW would be necessary in this area.

The existing 10th Street ROW is essentially from the existing back of sidewalk to back of sidewalk. The roadway width from face of curb to face of curb is 44-feet. The current preliminary plans show four traffic lanes on 10th Street between F Street and Egan Drive. The existing width of the street is adequate for four 11-foot lanes (outside lanes would be 11-feet *including* the gutter pan). Additional lane width would require additional ROW. The widening of the sidewalks along 10th Street will require approximately 3 feet of ROW along both sides of 10th street between Egan Drive and F Street.

The extension of Sitka Street into the Douglas Highway/ North Douglas Highway roundabout would require ROW from the north side of two vacant lots adjacent to 3451 Douglas Highway. The lots share common ownership with the lot to the east on which lies a single family residence (3451 Douglas Highway). The effected lots appear to serve as the yard for the aforementioned residence. The use of retaining structures will reduce the amount of ROW required.

The realignment of Douglas Highway between Cordova Street and the new roundabout would require a ROW take from the south side of the Breeze-In convenience store property. This ROW take may be at least partially necessitated by the addition of a left turn pocket to be constructed at the request of the Breeze-In to serve a planned expansion of the store. As such, a no-cost or reduced cost ROW acquisition should be negotiated with the Breeze-In owner.

7.4 Bridges

As discussed in section 2.11: Bridges, the Douglas Bridge cannot be feasibly widened and as such all improvements must occur within the existing cross section of the bridge. However, some modifications / retrofits would still be required on the bridge with the proposed solution.

The most significant modifications to the bridge involve the bridge railings. The railing that separates the existing sidewalk from the travel lanes will be removed and replaced with a concrete barrier. This barrier will be located 1.5' to the west of the existing rail location to provide a 7.5' multi-use pathway along the east edge of the bridge. Bicycle traffic will travel adjacent to this barrier so the height must be 42" minimum. The preliminary design reflects a 32" tall concrete barrier with a 10" tall metal railing constructed on top of the concrete barrier. As an alternative, the concrete barrier itself could be constructed with a 42" height eliminating the need for the metal railing.

The pedestrian railing on the outside of the sidewalk requires no modifications; however, any repairs needed to the rail system should be completed as part of this project. Preliminary inspection has revealed missing anchor bolts on at least one railing post.

The open railings on the outside of the Douglas bound driving lane and on the outside of the multi-use pathway may cause the users to feel uncomfortable as they can see the water below when walking, driving or cycling close to the railing. To provide additional visual screening the final design should consider placing a tight mesh chain link fence on the railings.

The existing asphalt concrete surfacing on the bridge should be replaced. To avoid increasing the loads on the bridge structure, the existing asphalt surfacing must be removed by grinding prior to placing the new surfacing.

Ten drains exist on the east side of the bridge. Figure 17 depicts the existing drainage grates. The new concrete barrier will be located over the existing drainage grates. The proposed design may abandon the existing drains. To accommodate drainage of the east side of the bridge deck it is proposed that two openings be located in the bottom of each 10' section of concrete barrier. The openings would allow water to flow through the base of the barrier, over the multi-use path, and off the east side of the bridge.

Figure 17: Existing Drain Grate, Douglas Bridge

Overhead reversible lane signage would be required at three locations on the bridge. Overhead sign bridges would be required to hold the signs. Supports for the new overhead sign bridges would have to be retrofitted to the existing bridge structure.

The expansion joints in the Douglas Bridge are in poor condition and the ADOT Bridge Design section has recommended they be replaced. These repairs should be completed as part of this project. Consideration should also be given to a general cleanup of the bridge interior and refurbishment of the interior lighting if funding permits.

7.5 Utilities

Widening of Egan Drive to the east and west of the 10th and Egan intersection would require reconfiguration of the existing storm drainage system and relocation of existing luminaires and fire hydrants located adjacent to the existing sidewalk along the south (channel) side of Egan Drive. Existing traffic signal poles and junction boxes would also need to be relocated; however, changes to the signal system at the intersection would require they be replaced anyway. No major utility pole relocations or telephone box relocations are anticipated.

The ADOT utilities section has requested that an existing 10-inch abandoned sewer line running through the project area be upgraded to a 24-inch culvert per ADOT regional Hydraulics Engineer's recommendation. The line is currently being used as a storm drain outfall for storm water collected from the Alaska Housing Finance Corporation (AHFC) Mountainview Senior Center and the University of Alaska Southeast (UAS) Bill Ray Center facilities. The line crosses beneath Egan Drive approximately mid-block between 10th Street and 12th Street. AHFC and UAS should bear the costs to upgrade the line.

Construction of the roundabout at the Douglas Highway/ North Douglas Highway intersection would require reconfiguration of the existing storm drainage system and relocation or replacement of existing luminaires in the intersection area. Underground water, sewer, electrical, telephone, and cable TV exist within the intersection area. These underground utilities will have to be considered when designing the roundabout and the associated regrading of the intersection area.

Several utility structures also exist within the roundabout area. A telephone / cable TV utility vault and several pedestals are located just west of the intersection of Sitka Street with the "frontage road" that connects Sitka Street to North Douglas Highway. A photograph of the area is shown as Figure 18. The current design does not impact these utilities. Work will be done very close to them and changes in the final design may cause impacts to these utility structures.

Figure 18: Existing Telephone / Cable TV Utilities at Sitka Street

Near the existing intersection of the Sitka Street frontage road and the North Douglas Highway, there is a water utility vault and an above ground pressure relief vent. These utility features are shown in Figure 19. These structures currently fall just outside the proposed footprint of the roundabout. Regrading of the intersection area will likely require adjustment or relocation of these utilities.

Figure 19: Existing Water Utilities near Sitka Street

A sanitary sewer lift station exists immediately adjacent to the west side of the Douglas abutment of the Douglas Bridge. The abutment embankment is retained using a mechanically stabilized earth (MSE) wall around the small building that comprises the lift station. The proposed solution does not impact the lift station nor the associated retaining wall.

7.6 Access Control

The primary access impacts from the proposed alternative occur on the Douglas side of the project.

The Douglas Breeze-In convenience store has recently applied for a driveway permit requesting revised access to the store to accommodate a proposed expansion. The access requested in the permit involves relocating the store driveway to the west edge of the property (furthest from the existing building). In addition, a dedicated left turn pocket is proposed on Douglas Highway for vehicles turning left from Douglas Highway into the Breeze-In parking area. The turn lane has been incorporated into the preliminary design. It may be desirable to prohibit left turns out of the Breeze-In driveway. The left turn movement can be accommodated via a right turn out of the Breeze-In, making a U-turn through the roundabout, and then proceeding east toward Douglas. The left turn prohibition may not be required today, but might be necessary as traffic volumes increase in the future.

Sitka Street and an associated frontage road currently tie in to North Douglas Highway approximately 170 feet west of the existing Douglas Highway/ North Douglas Highway intersection. The construction of the roundabout will require that the Sitka Street frontage road be extended approximately 130 feet to the west and reconnected to the North Douglas Highway. A left turn bay would be constructed for vehicles turning onto the Sitka Street frontage road from westbound North Douglas Highway.

On the Juneau side of the project, W. 9th Street would remain accessible by Right in / Right out only.

7.7 Cost Estimate

The preliminary cost estimate is shown as Table 15.

Item	Estimate
10th & Egan	
Earthwork	$96,000
Pavement	$599,000
Curb	$104,000
Water/Sewer	$13,000
Traffic Signals	$1,500,000
Reversible Lane Overhead Lane Controls	$1,200,000
Lighting	$300,000
Bridge Railing	$385,000
Bridge Expansion Joints	$230,000
10th & Egan Project Cost	$4,427,000
Construction Engineering (15%)	$664,050
Contingency (20%)	$885,400
Subtotal	$5,976,450
Douglas / N. Douglas	
Earthwork	$107,000
Pavement	$626,000
Curb	$172,000
Light Poles	$175,000
Douglas / N. Douglas Project Cost	$1,080,000
Construction Engineering (15%)	$162,000
Contingency (20%)	$216,000
Total Cost	$1,458,000
Project Totals	
Construction total	$7,434,450
ROW	$200,000
Utilities	$50,000
PE	
Expended	$527,545
Remaining	$328,553
Project total	$8,540,548

Table 15: Cost Estimate

7.8 Similar Projects

During the reconnaissance investigation, effort was made to seek out examples of bridges with reversible lanes in use in other areas of the United States and Canada. The Internet was searched for examples of reversible lane bridges and an email message was sent out to representatives of

the Western Association of State Highway and Transportation Officials (WASHTO) polling them on reversible lane use in their area.

The Internet search found numerous examples of reversible lanes bridges. Four relevant examples were found, all of which were in Canada. Representatives of three of the four examples were contacted and interviewed regarding their experiences with the bridge. The following summarizes the information gathered:

- Four Bridges were found:
    - Lake Okanagan Bridge, Kelowna, British Columbia Canada
    - Peace Bridge, Buffalo, New York to Fort Erie , Ontario Canada
    - MacDonald Bridge, Halifax-Dartmouth, Nova Scotia Canada
    - Lions Gate Bridge, Vancouver, British Columbia Canada (not contacted)
- Each bridge has a cross section of 36 feet or less available for traffic. Each has three lanes in the available cross section. Most are the result of a conversion from a two-lane bridge with shoulders. The Peace Bridge was converted from four lanes to three.
- All of the representatives contacted were satisfied with the operations of their bridge. None complained of serious accident histories.
- Two of the bridges have been in operation for over 10 years. The MacDonald Bridge was converted to reversible lane operation in 1999.
- None of the bridges had the reversible lane tie into a signalized intersection as proposed with the 10th and Egan project. Several were toll facilities and had connections into toll plazas.

Details of the interviews can be found in Appendix E.

Numerous examples of reversible lane facilities were also reported in email correspondence with WASHTO officials; however, most did not have the relevance of the examples reported above. Copies of the email correspondence are attached in Appendix E.

7.9 Visualization

A photograph of the existing Douglas Bridge was digitally edited to provide a representation of the future appearance of the bridge. The altered photo is shown as Figure 20.

Figure 20: Reversible Lane Bridge Visualization